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WILDLIFE IN NORTH CAROLINA

JANUARY, 1984 75 CENTS

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I Do Solemnly Resolve . . .

by Jim Dean

I hesitate to bring up the subject of New Year's resolutions since only columnists ever really makes any, much less keep them. Most of my friends and acquaintances change their lifestyles only when they get caught, and then only for the duration of their incarceration.

And yet, this time of year, almost all of us tend to look back on the previous 12 months and think of things either we wish we had done, or wish we hadn't. And quite naturally, there is a tendency to want to improve that balance in the coming year. Besides, making resolutions may be a nasty job, but somebody has to do it. So, as duty calls, here is my list for 1984. You are free to adopt any of these as your own, though I can't imagine why you'd want to.

— If someone hands me a persimmon and swears on his mother's life that it is ripe and succulent, I will not believe him.

— When squirrels persist in stealing all the bird seed from my window feeder, I will repress the image of how wonderful these little rodents taste fried.

Illustration by David Williams

—Never again will I purchase a bass lure simply because somebody tells me that it is absolutely the deadliest bass catcher of all time.

— From this day forward, I will eat only food that is good for me. No more noontime quail hunting breaks in country stores for potted meat, nabs, pig's feet, peeled tomatoes and Moon Pies.

— Life is far too short to miss any part of a day. This year, I will bounce out of bed each day and watch the sun rise. Dawn is a glorious time, so I'm told.

— There will be no more of this puffing and wheezing on the first hunt of the season. I'm going to get in shape and stay that way — and that goes for my dog.

— Speaking of dogs, when I encounter an engorged tick while scratching the ears of a beloved hunting dog, I will not say "yuk" and pretend I didn't feel it. Instead, I will joyfully pluck it off, thinking that the dog would happily do the same for me.

— Along the same lines, I will strive once again to find some love in my heart for poodles wearing ribbons and rat terriers in cute little woolen coats.

— I will mutter no profanities — not even think them — when some jerk gets in a stream ahead of me or runs his boat around me to fish a bank first.

— I will never buy another glass-lined vacuum bottle.

— Instead of reading only articles on how to tie a Bimini twist or fillet a moose, I will read some real, honest-to-goodness literature — something by Henry James, perhaps (or is that Jesse?).

— Whenever someone mentions how wonderful and kind Grizzly Adams is — and why can't everyone share his rapport with wildlife? — I will resist any temptation to suggest that Adams fondle a real grizzly.

— I will not miss a shot at a dove.

— I will not have a backlash on my casting reel.

— I will not sink the hook of a size 12 Wulff Royal past the barb in the fleshy part of my right ear lobe.

— If by some remote chance I should snag a bass plug on a stump or high in the limbs of a tree, I will smile and calmly go get it, all the while accepting full blame for its placement and making no unkind reference to its ancestry.

— In the interest of frugality, I will save all of my used plastic worms until I have collected enough to stuff pillows for my living room couch.

— I will not buy any more rods and reels until I have given all of those I don't use to some needy boy's club, although I may make an offer on a Bogdan salmon reel I think might be for sale.

— I will not forget to put the drain plug in the boat before I launch it.

— I will not wade into the water over my wadertops, nor will I fall into the water with an expensive camera around my neck.

— I will spend whatever time it takes to think of something good to say about James Watt.

— When it is time to write another "Our Natural Heritage", I will not get a cup of coffee, sharpen 47 pencils, clean out my wallet, or call a friend to discuss the color phases of Labrador retrievers.

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Cover *Fox squirrels are fairly common in parts of coastal North Carolina and in the Sandhills area, yet these squirrels are secretive and rarely photographed. Photograph by Terry Shankle.*

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Majestic Swans

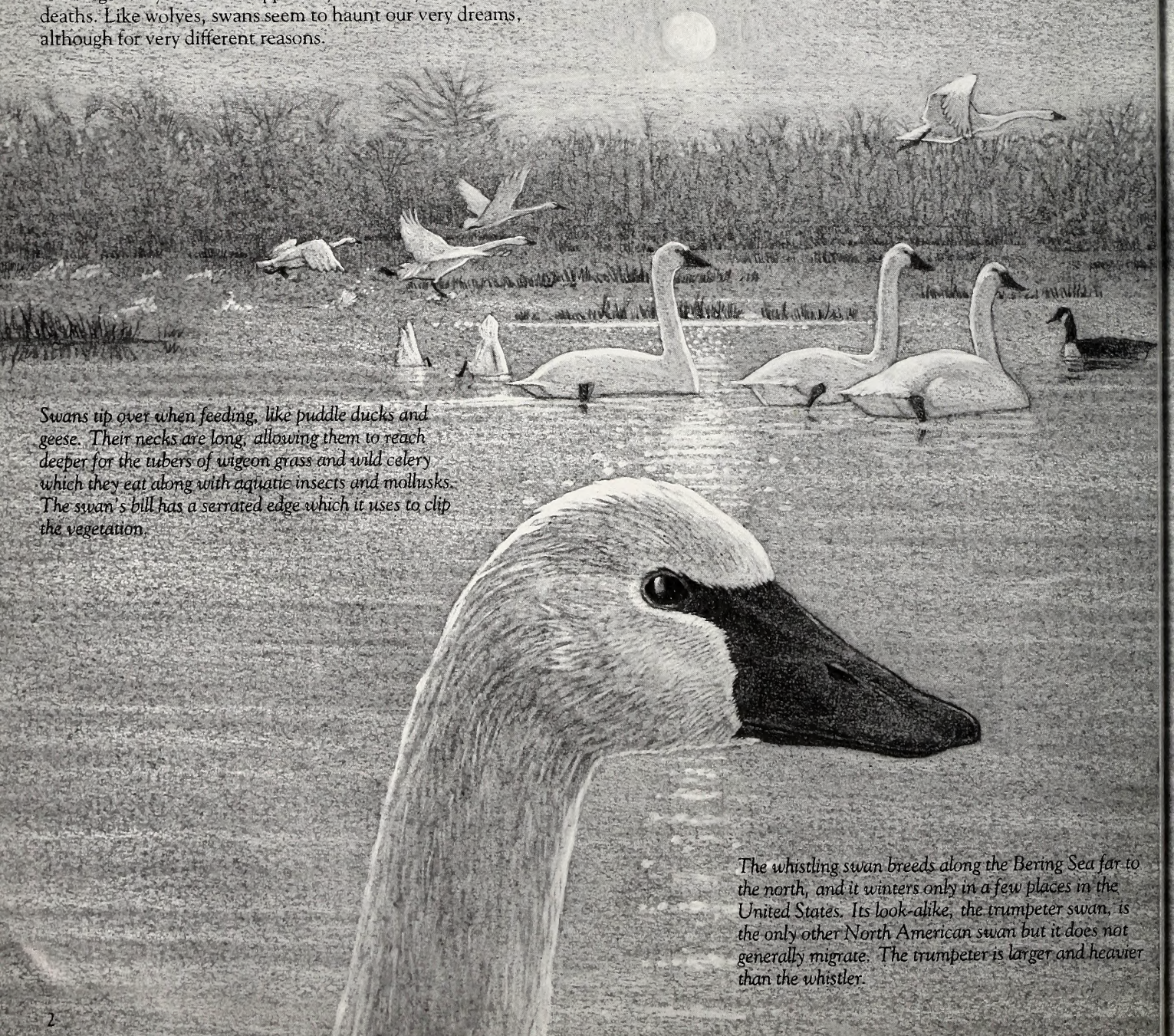
by Lawrence S. Earley / illustrated by David Williams

What is it about swans that makes them such familiar creatures in fairy tales and myths? Is it their white plumage, a color traditionally associated with beauty and innocence? Or is it their graceful carriage, their mysterious migrations, the touching attention they give their young?

Whatever the reason, there they are, ugly ducklings and swan-maidens and children turned into swans. There are swans that draw the chariot of the sungod, and swans that represent the souls of the dead. And there are swan-songs, those semi-legendary melodies supposedly uttered by swans at their deaths. Like wolves, swans seem to haunt our very dreams, although for very different reasons.

Today, of course, we take harder looks at swans. We know, for example, that they are actually members of the goose family *(Anserini)*, and that they are the largest of all waterfowl. Of the two North American swans, the whistling swan and the trumpeter swan, the trumpeter swan is the larger and the heavier. Only the whistling swan *(Cygnus columbianus columbianus)* is found in North Carolina, migrating all the way from the coast of the Bering Sea to its winter grounds from the Pamlico River north to the Chesapeake Bay.

We know also that the body of a swan contains 60 vertebrae (there are more than 25 in its neck alone), more than any other bird or mammal including a giraffe. The smooth contours of its white body are shaped by the dense plumage of over 25,000 feathers. Its bill has serrated edges which help it clip the aquatic vegetation it likes to eat. An oil gland at the base of its tail may



Swans tip over when feeding, like puddle ducks and geese. Their necks are long, allowing them to reach deeper for the tubers of wigeon grass and wild celery which they eat along with aquatic insects and mollusks. The swan's bill has a serrated edge which it uses to clip the vegetation.

The whistling swan breeds along the Bering Sea far to the north, and it winters only in a few places in the United States. Its look-alike, the trumpeter swan, is the only other North American swan but it does not generally migrate. The trumpeter is larger and heavier than the whistler.

provide waterproofing for the feathers. Or is it a source of Vitamin D? Biologists are still working on that one.

What may be more meaningful is to learn that much of swan behavior is dictated by the need for strong family units. Swan young, called cygnets, require almost a year of parental help. Thus, swans, like geese, mate for life for it is only with such strong bonds that their young will survive. In their summer nesting grounds, the parents take turns feeding the three or four cygnets that hatch from large white eggs. When it comes time for the parents to molt, first the female (called a pen) sheds her flight feathers, and then the male (called a cob) follows. If both parents molted at the same time, the young would be vulnerable to predators.

In late September, as the days grow shorter, the swans leave their breeding grounds and migrate south. But the family keeps together. Swans migrate in small groups, with several families consisting of adults and first-year young making up a V-shaped flight. In winter the parents remain with their young, feeding on aquatic plants and small animals like mollusks and insects. Parents and young will remain together until the migration to their nesting grounds in early spring.

The young are now on their own, but it will take several years before they mature. They may begin their courtship in their second years, but they won't take mates until their third or fourth years. They may not choose a territory and breed until the fifth or sixth year. New mates reinforce their bond by frequently engaging in displays called "triumph ceremonies." These displays typically take place after the male drives away another encroaching male. Then the victorious male approaches the female, and both raise their wings and utter loud cries.

Swans have prospered in North Carolina over the years — almost too well, some say. In some areas they have exhausted the contents of their aquatic cupboard and then ransacked the wheat fields of their human neighbors, prompting angry complaints. And yet even harassed farmers are not immune to the poetry of whistling swans as they rise over the sounds, their long necks undulating gently. ⊠

Whistlers take a long time to mature and young swans or cygnets, stay with their parents for almost a year. Strong bonds between mates are essential if the young are to survive. Accordingly, swans mate for life. During the long courtship, mates reinforce their bonds by joining in a triumph ceremony (left) when the male drives away a competing male.

Ken Taylor

Now, for the first time in North Carolina, you can donate part of your tax refund especially to help nongame and endangered wildlife.

Tax-Deductible Wildlife

by Mark Taylor

The air in the silo was freezing cold in mid-January, and outside 6 inches of snow blanketed the ground. Inside the silo, the silence was broken only by the steady click-click-click of pruning shears, and someone occasionally asking, "Got any more red maple?"

I was in college at the time, helping to furnish the grunt labor for a research study of deer — to be specific, the food preferences and nutritional needs of deer in the dead of a New Hampshire winter. My job was to convert mountains of brush into bite-sized morsels of deer browse. In turn, this food was carefully rationed out to captive deer in outdoor pens, and the weights of the animals were monitored throughout the winter.

To break the monotony, on sunny, windless days we opened the doors of the silo and watched blue jays pick through the waste grain that was ground into the snow and ice near one of the cattle barns. One day when the professor in charge of the project stopped by with hot coffee, I asked him how much food he thought it took to get a blue jay through the winter.

"Chances are, no one knows," he replied. "We got our grant for this work from the State Fish and Game Department. Since three bad winters in a row have almost wiped out the deer herd up north, there's been plenty of money for deer research. It was the same when I worked with deer in Wisconsin and elk in California. I don't know many biologists who work with nongame species, though. The research funds just aren't there."

That's the way it's been in wildlife management programs for some time. Game species, like black bears, white-tailed deer, wild turkeys and waterfowl, have whole cadres of wildlife biologists monitoring their every move. These biologists can tell you about the nutritional needs and food preferences of the white-tailed deer, the range of the black bear, and how much habitat a flock of wild turkeys needs for survival.

Ask about the population status and habitat needs of the box turtle, however, and you will probably draw a blank.

Fortunately, this situation will change in the near future. The reason? The Nongame Tax Refund Checkoff which was ratified last summer by the North Carolina General Assembly. This legislation will allow citizens receiving a refund from their state income tax to donate all or a portion of their refunds for the management and protection of nongame and endangered species in North Carolina. Nongame and endangered species are those mammals, birds, reptiles and fish which are not hunted, fished or trapped — and that comprises a heavy percentage of the total wildlife population. The tax-checkoff bill had the strong support of Governor James B. Hunt Jr., Senator Joseph Thomas of Craven County, who introduced the legislation, and many other legislators. The legislation also received strong support from the N.C. Wildlife Federation, Audubon Society, Sierra Club, Conservation Council of North Carolina, N.C. Nature Conservancy, and many other organizations.

In the past, nongame species have by

Ken Taylor

Endangered species like the brown pelican and loggerhead turtle are only two of the many nongame species that will be helped by the Nongame Tax Refund Checkoff. Federal sources of funds for endangered species have been slashed in recent years leaving states hunting for funds to maintain programs. Funds from the nongame tax refund will help.

and large played a small role in traditional wildlife programs, although habitat acquisition and management of game species have also benefitted many nongame animals. Game animals, like deer and wild turkey, have a strong constituency in a legion of sportsmen whose license dollars have restored populations of deer and other game

Ken Taylor

animals throughout the State. Ironically, there has been little funding for nongame wildlife programs despite the fact that the "constituency" for these animals includes virtually every citizen of the State — from urban birdwatchers to hunters who spend long hours in a deer stand watching a chipmunk frisk about. Endangered species have fared better, but recent cuts in federal funding have crippled endangered species programs in many states.

"The nongame tax refund checkoff will provide a specific source of funding for nongame and endangered species programs," said Jack Donnelly, nongame program coordinator for the N.C. Wildlife Resources Commission. "Currently, there are 27 other states that have nongame tax refund checkoffs. Checkoff programs have been very successful in other states, and we expect the same here in North Carolina."

Donnelly is coordinating what may become the largest and most popular wildlife program in the State in the near future. "North Carolina is rapidly changing, and the strong interest in a nongame program reflects that change," he said. "In the past, most people in the State either came from or grew up in rural areas, and experienced wildlife through hunting and fishing. Plenty still do, but this is changing. North Carolina now ranks 10th nationally in population per square mile, and is one of the fastest growing states in the country. Much of our population now lives in urban areas, and in the future many of these people will only experience wildlife in their backyards or through city parks. That's one reason developing a good nongame program is important."

Although funds from this year's tax refund checkoff won't become available until next summer, a full-time nongame wildlife program has already been put in place using "seed" money from general wildlife funds. Much of this seed money is being used to promote the program. The nongame program is housed in the Commission's Division of Wildlife Management, and has its own budget.

"The program will begin with three full-time employees," said Donnelly. "In addition to the coordinator of the program, we have an educational representative and an endangered-species project leader. These people will expand existing projects and develop new projects as part of the nongame wildlife program."

Here is a rundown of some of the projects that will fall under the program.

Environmental Education. Environmental education is one of the big priorities of the nongame program. The Wildlife Commission has served as the lead agency within the N.C. Department of Natural Resources and Community Development in developing an environmental-education program for schools, and the *Carolina Notebook,* a four-page environmental-education aid mailed free to over 5,000 teachers in the State, has been the end product of that effort. The *Carolina Notebook* is funded by the Wildlife Commission's Carolina Conservationist program, and is a joint effort of several state agencies.

"The nongame program will allow us to expand educational programs, including the *Carolina Notebook,*" said Donnelly. "Eventually, we plan to have an environmental-education program in the schools. The nongame education representative will be heavily involved in developing this program, and will also create other materials and programs dealing with nongame and endangered species for schools and the general public."

Endangered Species. Three endangered species programs are planned as part of the nongame program — including restoration programs for bald eagles and peregrine falcons and management and research programs for loggerhead turtles. Seventy-five percent of the cost of these projects will be paid from federal endangered species monies, and the remaining 25 percent will be financed by matching State funds from the nongame program. The Wildlife Commission has already received $45,000 from the U.S. Fish and Wildlife Service to fund these special projects.

The bald eagle restoration project recently completed its first year at the Lake Mattamuskeet National Wildlife Refuge in Hyde County. Last summer, two young eagles were "fledged" and released from a hacking tower within the refuge. "We hope to release eagles from two hacking sites this summer," said Donnelly. "One of the new sites may be located within the refuge. We're also considering future sites on the Croatan National Forest and the Camp Lejeune Marine Base. A lot depends on how many birds we can get — there's a big demand for young eagles for restoration projects throughout the country. It takes four to five years for bald eagles to mature and return to nest, so the restoration of bald eagles is a long-term project." Eventually, biologists hope to establish a nesting population of 30 bald eagles along the North Carolina coast.

An entirely new restoration project for peregrine falcons is planned for the mountains. These magnificent birds of prey reach speeds of over 200 miles per hour when they dive upon their prey. Populations of peregrine falcons were almost completely destroyed by the use of DDT and other persistent pesticides in the 1950s and 1960s; however, peregrine falcons have recovered since the use of these chemicals was banned in the early 1970s. Although peregrine falcons are often spotted on the Outer Banks during their spring and fall migrations, they are native to North Carolina mountains where they once nested on high exposed mountain crags and ledges.

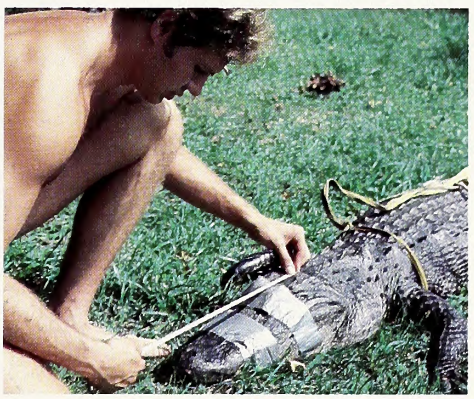
"The peregrine falcon recovery team has completed its work in the Northeast, where most of the suitable habitat has been filled," said Donnelly. "Now the team will turn its attention to the southern Appalachians. We've already selected two sites for restoration of peregrine falcons in North Carolina. One is on Grandfather Mountain, and the other is an urban site in Asheville. Releases of peregrine falcons in urban areas are not unusual; the birds often do quite well preying on large populations of pigeons. This project should be completed in five years."

The management program for endangered loggerhead sea turtles will also be continued. This program has been under way for several years, and was conducted by the North Carolina Natural Heritage Program of the N.C. Division of State Parks with the cooperation of the Wildlife Commission. Sea turtle nesting along the coast has been monitored, and important nesting sites identified. In areas where beach erosion will destroy nests, biologists sometimes remove the eggs from nests and raise the young turtles in

Species of nongame wildlife are found in all habitats. Some, such as the bald eagle (below), soar high above the landscape. Others, such as the Carolina anole (left), are quite secretive. But little study has been given to the numbers and needs of many of these species. Funds from the nongame tax checkoff program will help biologists manage Sandhills habitat for the endangered red-cockaded woodpecker (below, top). The alligator (middle) is another species that may be studied. Education programs are also planned to expose more people to wildlife (bottom).

Ken Taylor

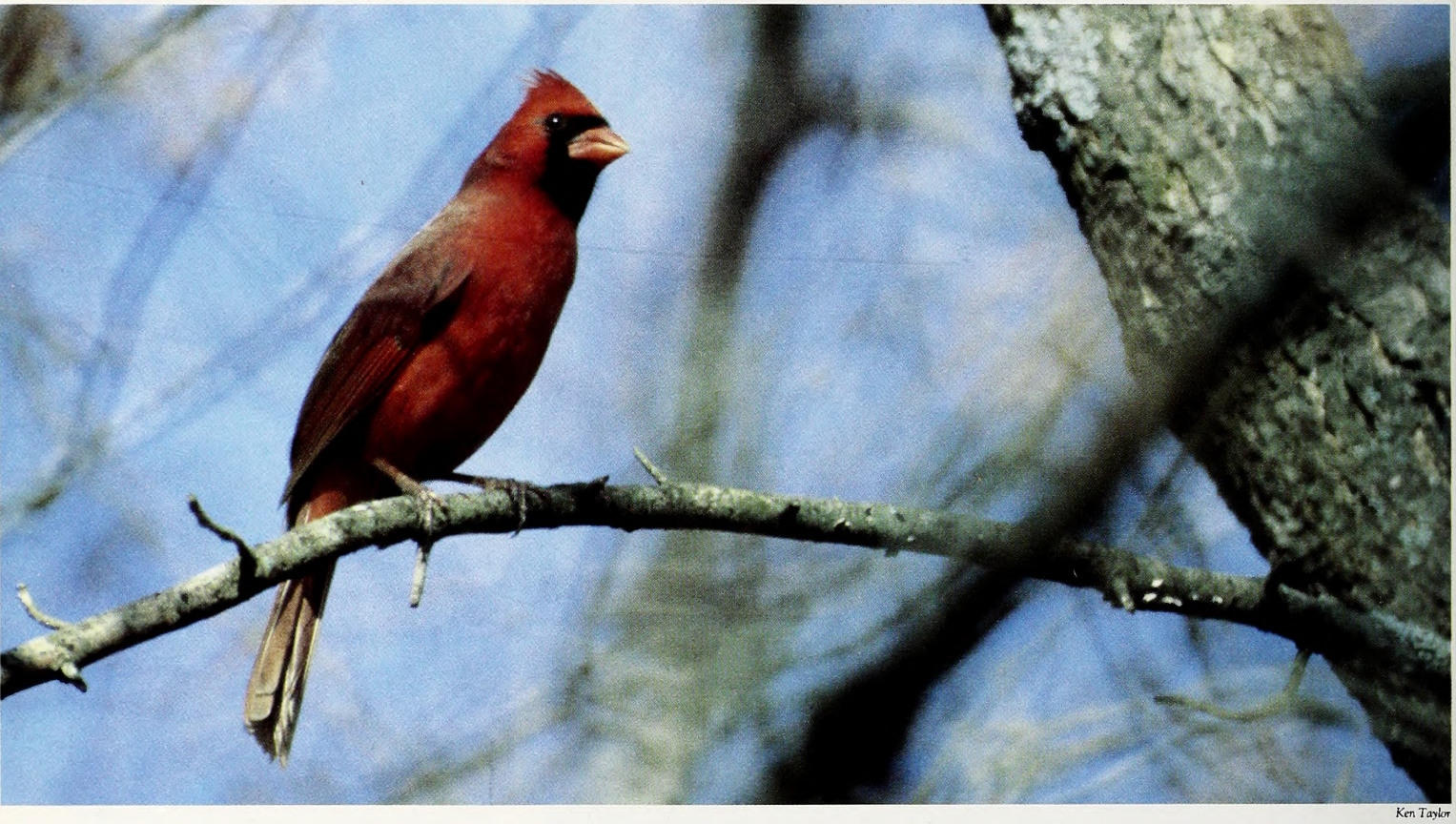
Jane Rohling



Tim Hergenrader

Ken Taylor

Black bears, white-tailed deer and other game animals shy away from cities, but urban areas are chock full of smaller creatures we often take for granted. Cardinals, gray squirrels and nesting owls can teach urban dwellers about wildlife biology, behavior and habitat needs. Funds from the nongame tax-checkoff program will support a variety of urban wildlife projects, from improving habitat to building nature trails. Observation blinds would give young people the chance to spy on species like the banded water snake (right).



Ken Taylor

Ken Taylor

Terry Shankle

How To Contribute

If you watch television, listen to the radio, or read the newspaper, you've probably heard about the nongame tax refund checkoff. The Wildlife Commission, conservation organizations, and dedicated individuals are working hard to promote the checkoff and make it a success. The literal bottom line for nongame and endangered species, however, depends on how you file your State income tax return in the next few months.

Start by taking a close look at the instructions for your 1983 North Carolina State Income Tax form. On page 2 in the lower right-hand corner are instructions on how to contribute to the North Carolina Nongame Wildlife Fund. If you wish to support this fund, enter a donation from your refund on line 21 of the tax form. You may designate a portion of your refund (not less than $1) or all of your refund to be used to manage and protect nongame and endangered species. This donation will not increase the tax you pay, and may be deducted from your income on the following year's tax form. If your tax returns are prepared professionally, tell your accountant that you wish to contribute to the nongame wildlife fund.

If you aren't receiving a refund but wish to contribute to the nongame wildlife fund, tax-deductible contributions may be sent to the N.C. Wildlife Resources Commission, Nongame Wildlife Fund, 512 N. Salisbury St., Raleigh, N.C. 27611. Please note on the check that the proceeds are to be used for nongame and endangered species.

Please give freely! Nongame and endangered wildlife need your help!

hatcheries before releasing them into the sea. On other areas where predation from raccoons and foxes is a problem, nests on the beach are protected by wire cages. Relatively little is known about the life of sea turtles in the wild, and young and adult sea turtles have been tagged so that biologists may learn more about their movements, ranges, life expectancies, and other habitats.

An on-going project dealing with alligators may also be continued. These animals are quite common in the southeastern part of the State, and biologists from N.C. State University have been tagging alligators and locating nests to learn more about the distribution, population status, movements, and habitat needs of these animals.

Urban Wildlife. "There's a great deal of potential for increasing populations of nongame wildlife in urban parks," said Donnelly. "This has been one of the most popular projects in nongame programs in other states. In addition to improving habitat, nature trails and observation blinds would be developed allowing people to view and learn more about nongame wildlife."

An urban wildlife biologist would be needed for this work, and hiring has been tentatively scheduled for the summer of 1985. This biologist would work with city and county governments to identify public lands that have strong potential as urban wildlife habitats. On these lands, cooperative efforts would be made to increase populations of nongame wildlife, and to develop nature trails and observation blinds.

"Volunteers will play a big role in this effort," Donnelly added. "Local Audubon societies, for example, could be a great help in planning and developing blinds and trails. This is a huge job, and the urban wildlife biologist would spend a lot of time working with volunteers and government officals. Eventually, we would like to have urban wildlife biologists stationed in each of the three regions of the State."

Other Projects. Donnelly sees a need for three other positions when funds become available. "There's a real need for a staff ornithologist to work with local agencies to improve habitat for birds on public lands in and near urban areas. This ornithologist would also help develop plans and materials showing people how to improve habitat for birds — and opportunities to view birds — in their backyards. There's a great deal of public interest in this.

"There's also a need for a small-mammal specialist. We know little about many small nongame mammals, and research is needed. Some of North Carolina's bat species, for example, are in trouble and need help. We've also got a lot to learn about aquatic invertebrates, and could use someone in this field. Some species of freshwater mollusks in North Carolina are found only in one or two ponds. Finally, there is a pressing need for a herpetologist.

Curtis Wooten

Public attitudes towards snakes are about the same as they were towards hawks a few years ago when many people believed that 'the only good hawk was a dead hawk.' Educational programs have changed attitudes towards hawks, and we need to do the same for snakes and other reptiles. We need to build public awareness of the vital role that snakes play in the natural world, and help people appreciate these interesting creatures."

How successful do officials expect the nongame wildlife tax refund checkoff to be in North Carolina? Very successful, if results from the 26 other states having nongame tax checkoffs are any indication.

"Virginia raised about $365,000 for nongame wildlife in the first year of its nongame tax checkoff program," said Debbie Paul, assistant to the executive director of the Wildlife Commission. "To date, Colorado has had the most successful tax checkoff program. In 1977, Colorado was the first state to adopt a nongame tax checkoff, and last year the citizens of Colorado contributed nearly $700,000 through the tax checkoff.

"We hope to raise about $350,000 for nongame wildlife in the first year of our tax checkoff. Based on surveys of participation and average contributions in other states, we feel this is a realistic goal for North Carolina. As the program grows in popularity, we feel this figure could top a half-million dollars annually. The sky is literally the limit, and a small contribution at tax time could make a big difference for the future of nongame and endangered species in North Carolina." ⊠

They're Tearing Up The Countryside

by Mark Taylor

There is something you can do about environmental horrors if you know the right number to call.

At one time or another, most of us have stumbled across an environmental horror show. As we looked at raw sewage flowing into a river or a bulldozer pushing red mud into a creek, we shook our heads and muttered, "This ought to be against the law."

Chances are it is against the law. In North Carolina, most major types of environmental abuse are already illegal. It is illegal, for example, to alter or destroy an ocean-front dune, fill or ditch wetlands, dump hazardous wastes, release raw sewage or chemicals into our waters or fill a creek with siltation while building a road or subdivision.

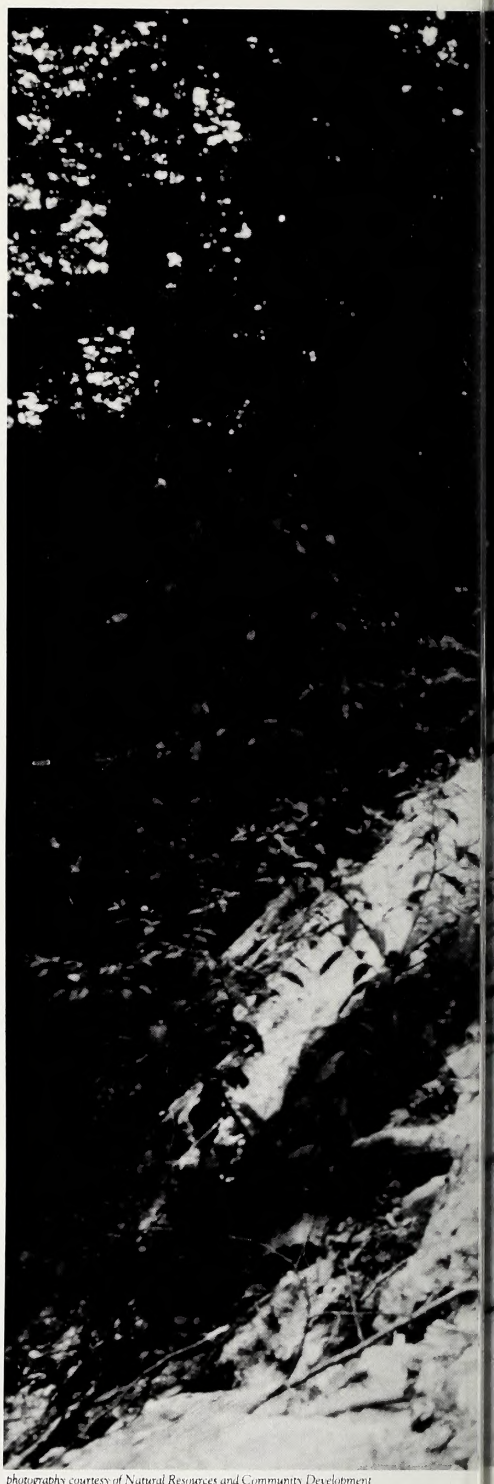
The problem is that these crimes often occur quickly, and often the damage is done long before the proper authorities know it. Inspectors are scattered across the State, and unless citizens report potential problems, many destructive projects go unnoticed until too late.

"The average citizen has no idea how badly we need his or her help in controlling environmental violations," said one official. "This is a big state, and our people simply can't cover it without help. People who hunt, fish, hike or travel are our eyes. If they see anything they consider questionable, they need to report it right away. If the problem is one we already know about, no harm is done."

Unfortunately, many people who see an environmental problem assume that the authorities already know about it. Ironically, sometimes the bigger the problem, the more likely it is to go unreported.

Destructive land-development projects built by fly-by-night contractors in western North Carolina are a good example. These have caused a great deal of environmental damage in recent months.

"We're experiencing extremely serious erosion and sedimentation problems in the mountains because of a surge in the number of second-home and recreational developments," said Randy Cotten, information and education coordinator for the N.C. Division of Land Resources. "These are not small-scale developments built by local contractors. Most of the problems are caused by out-of-state development companies which are often based in Florida. These companies buy whole mountainsides, and quickly cut many miles of substandard roads which soon wash out. Lots in these developments are often sold to customers sight-unseen, and many of the customers are elderly or retired people."



photography courtesy of Natural Resources and Community Development

The developers are generally violating

the state's erosion laws — the North Carolina Sedimentation Pollution Control Act of 1973. This law covers all construction and earth-moving activities involving more than one acre, and one provision says that developers must file an erosion-control plan. This plan details measures that will be taken to prevent erosion: silt fences, buffer strips of vegetation along waterways, and stabilization of slopes. Roads built in these developments must conform to certain specifications to prevent erosion. The developers are taking advantage of a loophole in the law, however, which exempts forestry from the Sedimentation Pollution Control Act. Consequently, there are no mandatory standards for logging roads.

"Many of these developments are begun under the guise of logging operations," said Cotten. "The developers cut a logging road up the mountainside, and harvest some timber from the homesites. Then, they plat out lots, dig ditches for sewer and water lines, and put up signs advertising

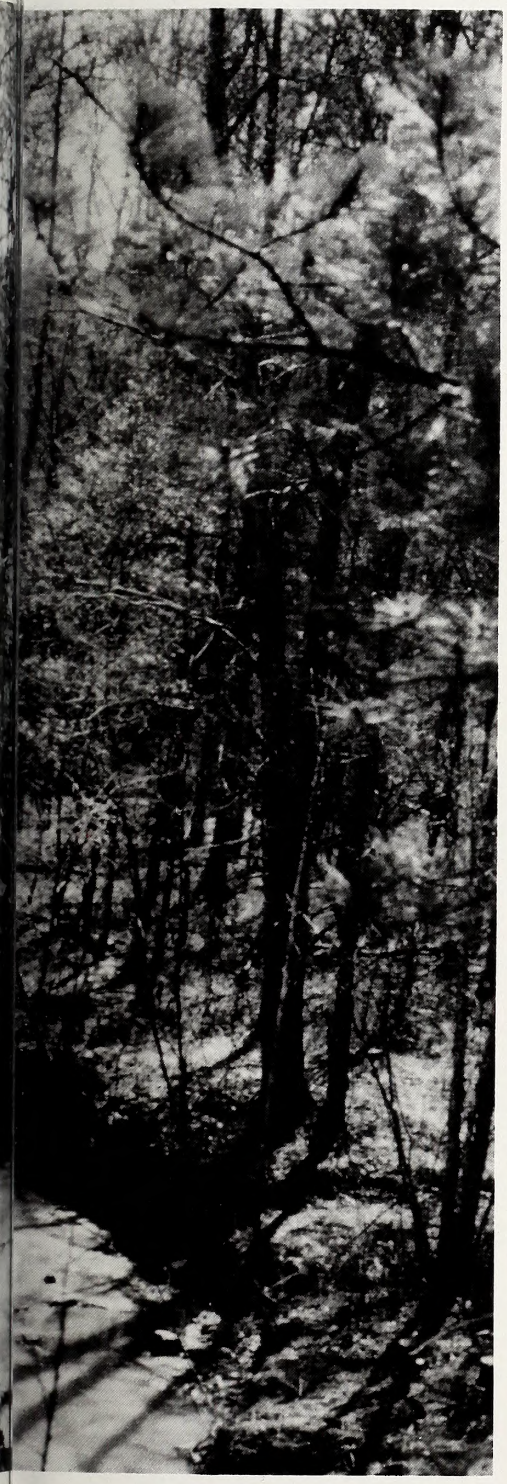
Though many development projects have proper approval before work begins, not all do. Indeed, illegal roads sometimes carve up a mountainside, and do considerable damage before the work can be stopped. This illegal road (above) was nearly completed before authorities learned of it, and silt damage from erosion was severe.

lots for sale. They seldom file an erosion-control plan. Since applications aren't required for logging roads, and many western counties have few if any land-use ordinances, it is often just by chance that we learn about these developments. These developers are either unaware of our erosion-control laws, or callously choose to ignore them."

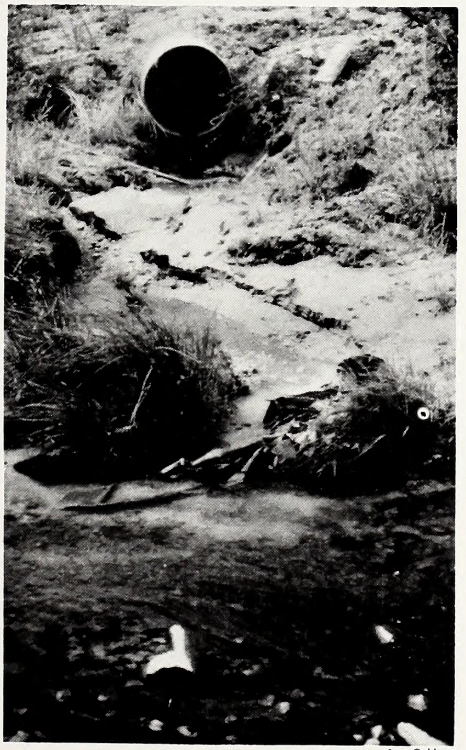
Roads in these developments are often built on slopes so steep that they can't be stabilized. Many developers bulldoze a strip of forest up the mountain, and dump gravel on top of the downed vegetation. When the trees rot, the road has no stable base and whole sections will quickly wash away. In some developments, the land is so steep that houses and parking areas would have to be built on stilts. Emergency services, including fire and rescue units, often cannot negotiate the grades of these roads even before they begin eroding.

This shoddy construction is expensive to both the environment and the homeowner. Siltation from eroding roads enters mountain streams, killing trout and other fish and degrading aquatic habitat. As the siltation moves downstream, it enters city water supplies making the treatment of drinking water more expensive. Recreation is also diminished in silt-fouled reservoirs. However, the ultimate loser is the customer, often elderly or retired, who sinks his lifesavings into a mountain "dream" home only to have it turn into a nightmare.

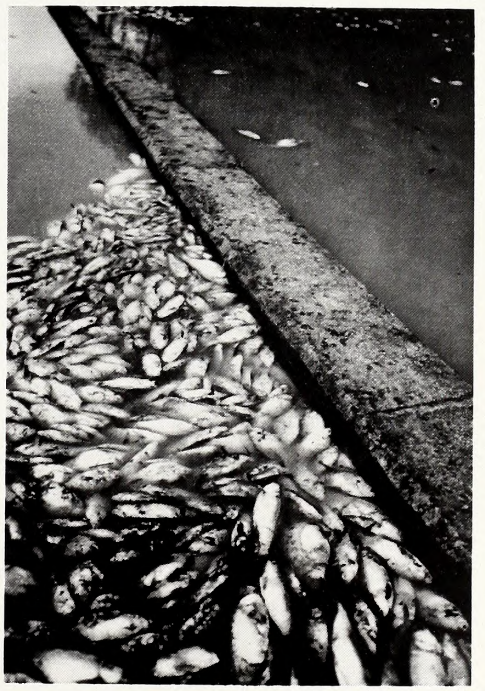
"Most people don't realize this, but once the developers have left or gone bankrupt the current property owners within the



Serious silting problems from development along streams (left) is not the only kind of environmental damage that often goes unreported. Illegal toxic waste dumps, fish kills and pollution running into public waters are all examples of serious problems that can sometimes be corrected or avoided if citizens play a watchdog role.



Jane Rohling



developments are responsible for maintaining roads and correcting erosion problems," said Cotten. "Many of these people think that they're buying land on a road that will be publicly maintained, and this is seldom the case. The deeds to these lots usually include the roads fronting the land. When the roads wash out, landowners are stranded without access unless they can raise the funds to have the roads repaired — which is often very expensive. Homeowners may also be liable for any damages caused by erosion of these roads. People should check these stipulations very carefully before they purchase land in these developments."

Cotton says that many of these new developments aren't being discovered early because of a lack of inspectors. "In the Asheville field office of the Division of Land Quality, there are only two inspectors responsible for inspecting road construction, dam safety, and development for 18 mountain counties," he said. "Yet, we're faced with a big problem. Between May and September of 1982, we issued 48 notices of violation of the State Sedimentation Pollution Control Act in western North Carolina, mostly for these large developments. We're just scratching the surface — new ones are turning up almost every week."

The rapid spread of dishonest and destructive land development projects are not the only problems that

sometimes go undetected. Picture six billion pounds of toxic chemicals. The figure staggers the mind, yet that is how much hazardous waste is produced in North Carolina every year — and some of it is still being dumped illegally on our lands and waters!

A bulldozer on the beach is almost always in violation of the laws which protect the seaside coastal dunes, and such damage often occurs in open disregard of the law. Yet, because the damage may occur in a scant few hours, authorities may not learn about it until too late — if at all. Concerned citizens should report any potentially damaging project, even if they are uncertain about its status.

The situation, while far from ideal, has improved greatly in the past few years. Major producers of hazardous wastes (over 2,200 pounds per month) are required to file regular hazardous-waste manifests with the N.C. Division of Health Services's Solid and Hazardous Waste Management Branch showing where and how this waste was disposed of. However, there is a weak point in the law. Industries and businesses which produce less than 2,200 pounds of hazardous wastes are still required to dispose of these wastes properly, but there is no mechanism to monitor this disposal. Some of this waste ends up on the land and in our waters.

"We receive about 75 to 100 reports annually of chemical-drum sites in eastern North Carolina," said Terry Dover, eastern supervisor for the Solid and Hazardous Waste Management Branch. "These dumps range in size from sites with one or two drums to chemical dumps containing 100 drums or more. Some are new dumps, and other existed before the new regulations were adopted. All kinds of things turn up in these dumps. Some are just empty barrels, and others contain extremely toxic and dangerous chemicals. Waste oils and industrial solvents, some very toxic, are commonly found. These chemicals are widely used by many businesses and industries."

A serious environmental problem that has received less attention than hazardous wastes is illegal dumps, which would seem a hard thing to hide but are very common. The only legal dumps in North Carolina are sanitary landfills. The three common types of illegal dumps are as follows:

Promiscuous dumping along roadsides is fairly common. Once this starts, a major dump soon develops. These dumps are not only unsightly, but also often contain chemicals which may contaminate nearby streams and groundwater.

Open dumps are usually operated illegally by individuals or businesses. If anyone is knowingly accepting trash or wastes on their land, an illegal dump is being operated.

The third type of illegal dump is the demolition dump, usually operated by contractors or developers. These dumps are generally used for the disposal of building materials (sometimes including harmful chemicals or other waste.

"Anyone who finds an abandoned chemical-dump site, open dumps, or demolition dumps should report it," said Dover. "Promiscuous dumping should first be reported to local authorities."

The coast is yet another area where illegal environmental violations are booming. It's not unusual to see a dragline clearing and draining a freshwater wetland for a shopping center or a bulldozer pushing fill into a salt marsh to create yet another "waterfront lot." Many times, no permit has been granted for such work. Who would have the gall to operate a piece of equipment as big as a dragline in plain sight if it weren't legal? The answer is "lots of folks" — it happens all the time.

Both freshwater wetlands and coastal marshes are strictly protected under state and federal laws. If you see a piece of heavy equipment operating in these areas, laws are probably being broken.

"Section 404 of the Clean Water Act protects freshwater wetlands," said Cliff Wynefordner of the Army Corps of Engineers Office in Wilmington. "Although ditching these wetlands is not illegal under Section 404, the placement of the dredged spoil or any other fill on these wetlands is illegal. Violations of this law commonly occur when someone attempts to drain or fill a wetland, and convert it to another use. We urge anyone who sees wetlands being destroyed to report it."

The same goes for coastal marshes. "All coastal marshes and wetlands are protected by the Coastal Area Management Act," said John Parker, permit coordinator for the N.C. Office of Coastal Management. "Any activity that alters a coastal wetland is illegal, and common violations include filling wetlands and excavating wetlands for boat basins and other uses. Please report these violations — wetlands are being destroyed a nibble at a time."

What are some other common environmental violations? Releases and spills of chemicals and other materials are obviously illegal. Fish kills are illegal. Treated discharges into our waters are legal, but if the discharge doesn't look and smell clean, someone may be violating a permit. Razing the frontal dune on the ocean beach — often done to give a homeowner an ocean view — is illegal. Building structures on the ocean beach is invariably illegal.

What should you do? First, don't get involved or confront the potential violator. Even if violence is avoided, your confrontation may make it difficult for authorities to catch him in the act of committing a violation. The best solution — if there's any doubt about an activity — is to simply call the appropriate state or federal office and report the violation. A handy reference accompanies this article. Clip it and put it in your wallet. Maybe you'll never use it, but if you ever do, you may help save a valuable chunk of our deteriorating environment. ⊠

Resources

Call the following numbers to report violations of our environmental laws:

- — Hazardous waste sites and illegal dumps — 919-733-2178
- — Oil and chemical spills, water pollution, fish kills — 1-800-662-7956
- — Mountain developments and siltation problems — 919-733-3833
- — Dune destruction and filling of coastal marshes — 919-733-2293
- — Destruction and filling of freshwater wetlands — 919-343-4631
- — Wildlife violations and fish kills — 1-800-662-7137
- — Marine fisheries violations — 1-800-662-7956

Late Season Squirrels

There are advantages to hunting squirrels in the winter.

by Ed Jenkins

"Kut, kut, kut . . . kut, quaa . . . quaa . . . quaaaae." Again, the barking of the gray squirrel interrupted the silence of the January morning. My eyes searched the dark limbs silhouetted against the blue and gold dawn sky for anything looking remotely like a squirrel. I had narrowed the location of the scolding squirrel to the large,

Leonard Lee Rue III

vine-covered poplar tree before me, but even with no leaves remaining on the tree, there were hundreds of hiding places. The squirrel probably had seen me ease into those sandy, Brunswick County woods that morning, and sit on the frost-covered ground with my back to the large southern red oak. His patience with the large creature that had invaded his territory evidently was wearing thin. Curiosity was overcoming caution. Something was driving the squirrel to move closer and challenge the intruder, but for now, instinct told him to remain concealed.

Something was also tugging at me to try to sneak closer for a better view of the tree, but as I had learned from my hunting apprenticeship on squirrels as a youngster, my best bet was to sit tight and wait him out. The dipping movement of a tree limb to my right caught my eye and signaled a new twist to the situation. A second squirrel weaving through the green cover of pine and yaupon limbs at the bay's edge was coming to see what all the commotion was about. I slowly began drawing my left knee towards me so that I could use it to brace my scoped .22 rifle for a possible shot. The movement was detected, and the squirrel suddenly stopped somewhere on the back side of a large pine.

About 40 yards to my left, the brushing sound of a small limb being weighed down by a landing squirrel drew my attention. "A third squirrel?" I wondered. "That's all it could be. This place is full of squirrels."

As I was to find out that day, January is the ideal time to hunt squirrels. The distraction of deer hunting is over and it's back to the slower pace of small-game hunting. There are no mosquitoes, ticks, chiggers, gnats, biting flies, and snakes to contend with. Even my nemesis, poison ivy, is subdued. Getting around in the woods is easier because the thickets and vegetation, so impenetrable in September, have been knocked down by the cold. Nights are cold but crisp; sunny days are invigorating.

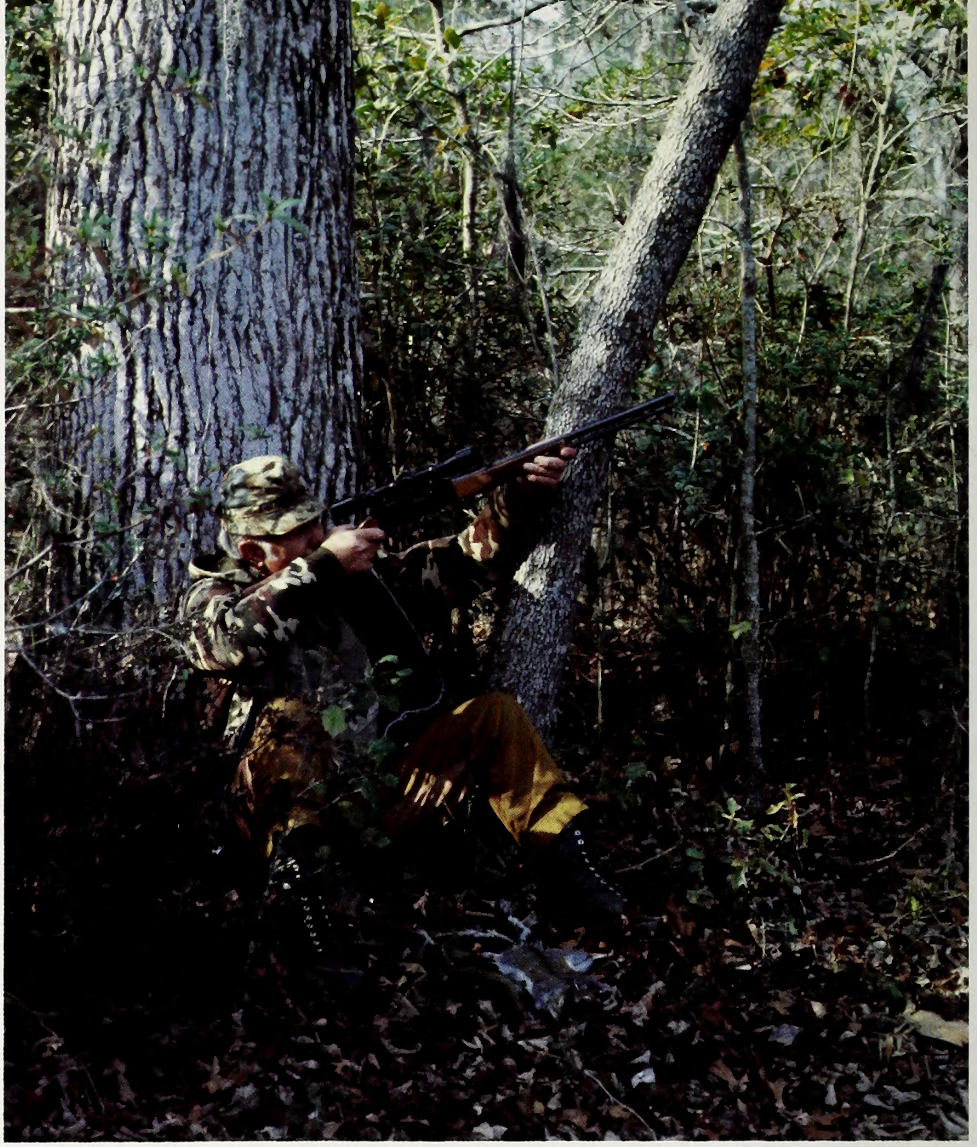
Squirrel hunting in January is different from hunting earlier during the season. Once the leaves fall, squirrels become more secretive and harder to locate. Many of the young squirrels that acted as if they were unconcerned with danger as they fed under the protection of a canopy of leaves learned too late that they were on the low end of nature's food chain. In the winter, the hunter will find that squirrels favor the cover of evergreens, hollies, and swamps over the open oak ridges where they are numerous in the fall.

From daybreak until an hour after sun-up is the best time to find squirrels on the move. The next best time is late afternoon. Many times in the winter the leaves are wet, allowing a hunter to sneak up on feeding squirrels. However, my favorite tactic is to take a stand below a large oak den tree and wait for the squirrels to start moving. Don't shoot the first squirrel you see. During this time of year, the females, called sows, may be pursued by several courting males, or boars. If you sit tight, more will usually show up. After killing one, mark its location, but leave it there for the time being. After a few minutes of silence, the squirrels will begin moving again.

Another advantage to late-season hunting is that there is usually no shortage of places to squirrel hunt. Even small woodlots can be productive. Many people who post or lease land during the deer season will give small-game hunters permission to hunt after deer season ends if the owners are approached properly.

One factor hunters should keep in mind is that winter rains usually keep the ground soft during this time. There is nothing more responsible for the closing of hunting lands to the public than dirt paths, roads, and fields being chewed up by vehicles — especially the four-wheel drive type. When the ground is soft, hunters should park their vehicles and walk to where they are going. This kind of consideration will show landowners that the guests on their property are responsible individuals. Those who are courteous and considerate of the wishes and property of others are usually welcomed back.

The best squirrel gun is a matter of personal preference. Shotguns, .22 rifles, .22 pistols with 6" barrels, and bows and arrows (the hard way) all are legal, and custom often dictates the weapon. In western North Carolina where squirrel



Ed Jenkins

In late winter, it's much easier to see squirrels high up in a tree because the leaves are gone, and those that have fallen are likely to be wet, making it possible to move more quietly through the woods.

Leonard Lee Rue III

hunting is more of a tradition than in the east, it is said that there are people who will not invite a person into their house who squirrel hunts with a shotgun. And anyone hitting a squirrel with a rifle bullet anywhere except in the head is in for a ragging from his fellow hunters.

Since squirrels were a significant source of meat to our forefathers, it always was desirable to damage as little meat as possible, and the tradition of marksmanship in squirrel hunting is well-known. American frontiersmen were said to "bark" squirrels out of trees. This was done by aiming at the bark of the limb the squirrel was pressed against. The concussion of the bullet striking the limb killed the squirrel without any damage to the meat.

We still have modern-day nimrods. Danny Swilley, a young hunter from Henderson, hunts only with a .22 rifle, and he only likes to take shots at running squirrels. It's up to every hunter to determine what his standard should be.

There is a practical reason for using a .22 rifle instead of a shotgun to hunt squirrels — noise. A hunter, especially one using .22 short ammunition, can pick off a number of squirrels in the same location before the rest are spooked, but one blast from ol' Betsy and the shotgun hunter might as well move out of hearing range to continue hunting. I personally prefer a shotgun for squirrels in certain situations. One is when I'm combining a squirrel and duck hunt while wading a swamp or floating a creek. Another is when hunting with a dog and several people. Under those circumstances, I feel a shotgun is safer.

As most hunters know, there is a certain satisfaction in hunting and providing food for the table. For those who are not squeamish about using meat that does not come wrapped in cellophane on a white Styrofoam tray or not pumped full of growth hormones, a plate of tender, fried or barbecued squirrels or a pot of squirrels and rice is delicious. As with most wild game, the secret to good taste is in how the meat is handled and prepared. A pressure cooker can do wonders for a tough old boar squirrel. Most of the squirrel I've eaten has been tender and succulent, with the exception of my wife's version which usually resembles and tastes like a ball of gum rubber on a Popsicle stick (recipe available upon request; write me in the doghouse).

The squirrels we killed in Brunswick County that cold January morning last year appeared to be in good shape. They were fat, and the soft, glossy fur was free of any

warble larva or "wolves" that are common during the fall. The winter had been mild and the mast crop plentiful, but we knew worse weather and nature's relentless harvest of surplus animals were ahead.

Squirrels are not hibernators and must feed throughout the winter. When a prolonged period of severe weather is coupled with a mast crop failure, squirrels often succumb to malnutrition, parasites, and diseases. And the longer a squirrel has to search for food on the ground or in open tree limbs that have shed their cover of leaves, the more subject it is to predation. Hunting accounts for only a small percentage of squirrels that will die every year before the winter young are born. Wildlife biologists believe that the number taken by hunters has little, if any, effect on the total population.

Squirrels also quickly bounce back after their numbers are reduced. Predators, for the most part, are opportunists and prey on the most abundant food source. As the squirrel population decreases, other food sources simply become easier to catch, so

Our Phantom Squirrels

by Terry Shankle

Almost everyone is familiar with the grey squirrel, but its larger cousin, the fox squirrel, is something of a mystery to most North Carolinians. This became very clear at the 1982 N.C. State Fair when practically no one could identify two mounted fox squirrels on display in the N.C. Wildlife Resources Commission tent.

Though twice the size of a grey squirrel, the fox squirrel is rarely seen in eastern longleaf pine and turkey oak forests or in the pocosins and bays where it is most common.

Because of their relative scarcity, excellent camouflage, and extreme wariness, little research had ever been done on the eastern fox squirrel. But recent work by Dr. Peter Weigl of Wake Forest University is changing that. Assisted by Terry Sharpe, a Wildlife Commission game biologist, and Joe Newman, a wildlife enforcement officer in Brunswick County, some information is finally being accumulated.

Under a research program sponsored by both the Wildlife Commission and Wake Forest University, approximately 400 nest boxes have been placed in prime fox squirrel habitat in the Sandhills Game Land and Brunswick County. With help from a research assistant, two graduate students, and two undergraduates, the nest boxes are checked three or four times each year. Grey squirrels, screech owls, snakes, flying squirrels, opossums, and raccoons are most often found, but fox squirrels are captured approximately five percent of the time. Data is recorded from all captured fox squirrels before they are released, and some are fitted with radio telemetry collars. From this work several conclusions have been drawn.

"Fox squirrels are very wide ranging animals for their size," says Dr. Weigl. "They sometimes feed over an area as large as 80 acres. They are also highly dependent on large, mature stands of pine-oak forest, and these stands are either disappearing or are being cut up into areas too small for successful habitation.

"Reproduction and survival are very closely related to food supplies," says Weigl. "During years of abundant food, females will produce larger litters. But during years when longleaf pine cones and acorns are few, litters are small or nonexistent.

"During late summer and fall the squirrels' main diet is the giant, green cones of the longleaf pine. These cones often weigh up to a pound, and over the years the fox squirrel has evolved to such a size and strength that he can easily tear apart the cones to get to the nutritious seeds."

At present, fox squirrels are not uncommon, and are numerous enough that some restricted hunting is allowed in 17 southeastern counties. Hunting isn't the real threat to the fox squirrel's future; destruction of suitable habitat is. It is hoped that research will yield enough knowledge so that biologists can come up with a management plan that will help protect the dwindling habitat. No doubt, it will require the cooperation of all landowners — both public and private — to maintain a suitable amount of mature longleaf pine habitat. The future of the fox squirrel depends upon that cooperation.

Though the gray squirrel (left) is abundant throughout the State, the larger, more secretive fox squirrel is still fairly common in large Coastal Plain forests, and it is not unusual for hunters to bag both species (below).

Terry Shankle

Ed Jenkins

Ed Jenkins

fewer squirrels are taken. The smaller number of squirrels also means food for the remainder and higher survival and reproductive rates.

Gray squirrels have two litters a year. Winter breeding usually takes place from mid-December to mid-January. The female carries its young for six weeks before giving birth to three or four blind and hairless babies. The young squirrels are nursed for seven to 10 weeks; during this time, they grow quickly. At about seven weeks old, the young begin to venture out of the nest with their mother and eat some solid food. As soon as they are able to care for themselves, the female mates again. Her second litter usually will be born around the end of July.

Young squirrels must learn quickly or they won't last long in the wild. Hawks, owls, foxes, snakes, raccoons, and bobcats top the long list of predators. In urban areas where natural predators are fewer or nonexistent, many squirrels fall victim indirectly to man. Cats and dogs, man's pets, take a considerable number of squirrels that are not as wary as their counterparts in the wild. Automobiles also kill a large number of city squirrels. But the greatest danger to squirrels and all wild creatures is man's constant development and the resulting loss of suitable wildlife habitat. Squirrels are more fortunate than many wildlife species in that remnant populations can adapt to urban environments.

Man can have some positive influences, though. Wooden nesting boxes and tire dens placed in trees supplement natural den trees. While squirrels prefer natural cavities in trees, most of our forests are second- and third-growth timber and many of the older, den trees have been removed. Artificial dens can alleviate the housing shortage, and squirrels can be attracted to areas where food is available. Studies in North Carolina and other states show that the number of available dens is second in importance only to the food supply in determining the squirrel population in a given area. Artificial housing is playing an especially large role in the study of and increase in the fox squirrel population in some areas.

If you've been one of those hunters who never considered squirrel hunting after autumn, you're missing perhaps the best squirrel hunting of the season. Get away from the house and the humdrum of television and spend a day in the woods. It's the best tonic I know for that mid-winter case of the "blahs" and also a good way to start working off those post-holiday extra pounds. ⊠

A Life On Black Water

For over 50 years, Dr. Richard Snipes has sought the redbreast sunfish in his beloved southeastern coastal rivers.

Interview by Lawrence S. Earley and Ted Dossett

Across the gently sloping coastal plains of the Southeastern United States runs a meandering network of rivers, streams and creeks. In North Carolina some of the largest are the Cape Fear, the Black, the Lumber and the Waccamaw. These rivers and streams are slow-moving after they leave the Piedmont, and they are dark in color. The blackwater streams common to this area are highly acidic and low in mineral content. It is a scenic region, with bald cypresses hung with Spanish moss. Sandy ridges form islands throughout this low, swampy and wilderness area.

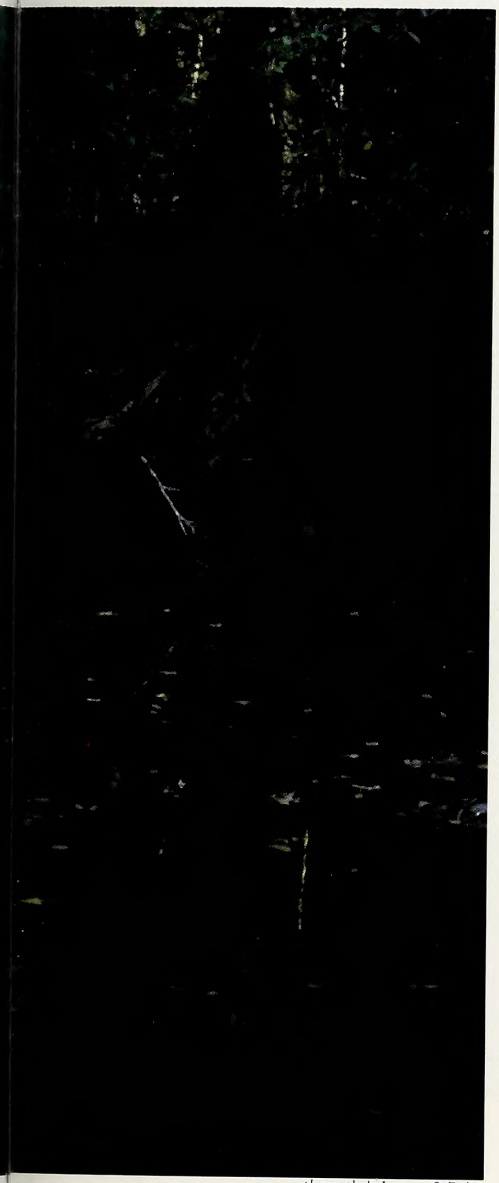
In these rivers and streams, the sand and gravel bottoms provide spawning grounds for one of the most popular game fish in the southeast, the redbreast sunfish (also called robin locally). Some fishermen in the region have made a specialty out of coaxing the elusive redbreast from its blackwater habitat.

One of these is Dr. Richard Snipes of Fayetteville who for 41 years has combined a career as an obstetrician with a passion for redbreast fishing. The nearly 10,000 babies he's brought into the world may not be a record, but he does hold at least one world fishing record — for a 1-pound, 2-ounce redbreast that he delivered from the Little Peedee River on 6-pound test line. (Recognition for another record is pending.) He'll tell you of other highlights of his medical career — the time he delivered three consecutive sets of twins, for example, or the mother who gave birth to her four sons on the same date in different years. But he'll also spend an hour talking about his success with redbreast over the years, and the names of the rivers he's fished sound like a litany of the great fishing streams of the Southeast.

Wildlife in North Carolina *had its tape recorder ready when Dr. Snipes shared some of his fishing experiences.*

I was born in Hamlet, North Carolina, in 1917, and have lived and fished in North Carolina all my life except for a period in the Army in Europe. I was in Europe in '43, '44, and '45 with Patton. I started going to the Black River when I was four years old so I've been fishing a pretty good spell.

I fish primarily for enjoyment, certainly not for the fish and not for any glory because I don't string them up and go show them. In fact, I turn loose most of what I catch. It's relaxation of the first order and



photography by Lawrence S. Earley

There's gold in blackwater — redbreast gold! During more than 50 years on the blackwater rivers and streams of the southeast, Dr. Richard Snipes of Fayetteville (left) has caught his share of redbreast, or robin as they are also called.

it's a challenge. I enjoy going to the toughest place you can find and trying to outwit them. I like that challenge.

My father was quite a fisherman. We fished Ledbetter and Little River and Drowning Creek, Little Pee Dee, farm ponds around home, Joe's Creek Farm. We fished primarily in Scotland County. Robert E. Lee Mill was an old grist mill on Shoeheel Creek. We also fished at Gwen's Mill there on the Scotland County border and we fished the pond at Maxton, a big pond there, but Lee's Pond was our best fishing place. In fact, we put the bream in there. Lee's Pond was a pond that had only openmouth perch, black bass, and flier bream in it at the time. There was a mudhole over on Wagram Highway that dried up one August and my brothers and Joe Lee went over there and got seven 50-gallon drums full of small bream and put them in the Robert E. Lee Mill. Those were the first bluegill in that pond.

I also stocked some of the first shellcrackers in North Carolina. I've fished Florida since 1932 and on one occasion I went to Okeechobee. The pilot hung his plug over in the reeds. While going to get his plug free, he found this big shellcracker bed. So we fished a Friday afternoon and Saturday using night crawlers and we brought about ten lard stands of shellcrackers back with us. Some of them weighed 30 ounces on the scale, and I decided we had to have some of those in North Carolina. This was in '47 or '48, about 10 to 15 years before North Carolina introduced them.

So I ordered some out of Georgia and put these in five or six locations in Cumberland and surrounding counties here. I put some in Crystal Springs, some in Mr. Bramble's pond, some in Mr. Claude Rankins' pond on the Raleigh Road here. I put some in Upchurch's pond and some in Charlie's Rose's pond, and they took in all of these lakes and streams and are still present in these streams, the original stocking. About three to four years after they were stocked in the Cape Fear River watershed, someone caught one at Lock No. 1 that weighed 2 pounds and 2 ounces. This account was in the paper at the time. Thereafter, they did especially well in Town Creek and Town Creek to this day has a heavy population of shellcracker bream.

I learned a whole lot from different people as I was growing up. For instance, for redbreast, there was Johnny Gore. Johnny was an expert on the Waccamaw River and Mr. A.F. Goldston was an expert on Lake Waccamaw and the Waccamaw River. Waccamaw was one of our favorite fishing holes then. My brother and I caught 33 bass there one afternoon and morning with topwater bait, weighed a hundred and some pounds. Mr. Goldston was a professional deer hunter, and in his spare time he fished for rock fish in Indian Creek at Wilmington and Town Creek. We'd troll with a spoon there and the rock come into Town Creek on a full moon in June. There was a fellow, Charlie Lesane, he'd go to Newby's Landing at Black River at Atkinson and fish the mouth of Kelly's Cove. There'd always be a 25- to 30-pound rock that would spawn in the mouth of that creek each June on the full moon. He'd take two surf rods, put a quarter of a pound redbreast on his terminal tackle with a 4-ounce weight, sit in a chair on the bank, throw his two rods out and wait there till he caught his rock. Then he'd wind up. That was his yearly fishing trip!

I learned from Mr. Gore and Mr. Goldston, and I also learned from another man, Daddy Clark, who lived up the street. He had a car but couldn't drive and I paddled him a lot. I also paddled for a man who was an expert topwater fisherman, Ralph Morrison. This boy cast what was known as a "surprise perch." That was one of the old topwater baits with a spinner in front and a spinner after it. It looked a whole lot like the old John Dillinger plug that came along later that would float. John Dillinger would sink; this one would float. Western Auto had one

modeled after the John Dillinger that would sink but soon as you caught a bass on it the hook would pull out. But that old surprise perch would float and I learned a whole lot from him.

He'd go to Clear Lake and get back in the head of it where the logs were and you could see the bottom anywhere. We used the 30-pound test linen line at that time, and cast an ounce and a quarter to an ounce and a half plug, no drag and no release of the spool, no free spool. He'd throw that thing out and he would put his rod and reel down and light a cigarette and smoke for about five minutes, then he'd pick his rod up and just twitch it one little time and a bass would get it. It would drive you crazy watching him. He knew how to do it and he caught a lot.

I fished a whole lot at night back in my younger days when I didn't have to work like I do now. I used a Buel barb. Old timers would call that barbing. They'd take a cane pole and take a umbrella stave and attach that to the end of the cane pole and run a short piece of line from the umbrella stave to the Buel barb and would pull that back and forth like these lunker lures they use today.

I worked when I was going to college and medical school. I worked every summer but I still fished every Saturday and Sunday. I always fish now. I fish three days a week, Wednesdays, Saturdays and Sundays now. Sometimes I fish more.

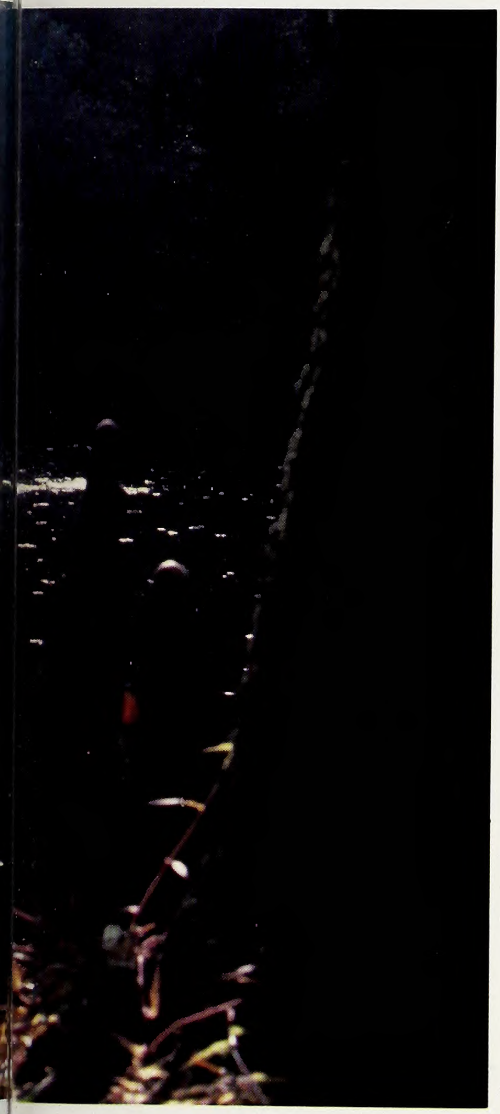
Redbreast is my favorite fish and he's a challenge. Anytime you can catch a mess of redbreast you've done your day's work. He strikes hard, he'll take a topwater fly, he'll eat an underwater spinner, he'll test your tackle. If you use light tackle he'll head for a stump and you'll come up emptyhanded. The greatest challenge I've ever had fishing is catching redbreast consistently and knowing when to go redbreast fishing and how to take them. There's many ways, from a hopper hook to a basket to a spinner, a bug, set hook — there's many ways to fish for them. I know them all.

I've fished from here to Key West and I know the rivers and streams along the way: The Lumber, South, Black, and Cape Fear in North Carolina; the Little Peedee, Black, Sampit, Black Mingo, Edisto, Combee in South Carolina; the Satilla (Big and Little) in Georgia; the St. Mary's, St. John, Suwanee, Withlacoochee, Oklawaha, Kissimmee, Okeechobee in Florida. I know the landings all the way to Georgia, places like Wagon Wheel, Sandy Bluff, Little Peedee Lodge, Needle's Eye, Gallivant's Ferry, Locust Landing, Jones Landing, Red Banks, Punch Bowl.

When I go redbreast fishing I take a rod that I've made myself and I use an ultralight spinning reel on it. I either put 4-, 6- or 8-pound test line on it. I fish that with a spinner that I make. It's on the order of any other spinner bait only it's lighter. I take a 32nd of an ounce weight and cut half of it off so that the hook-jig part is about a 64th of an ounce and the spinners are the lightest in the world that I use. I either put a piece of rubber back of it, a piece of pork rind, a piece of night crawler, a piece of catalpa worm. Many times redbreasts will eat a catalpa up, sometimes they won't look at it. I also take a bream buster along when I go to the river. A bream buster is a fiberglass telescoping pole that I use. If the river is open I use a 12-foot one; if the river is narrow I use an 11-foot one so that I can slingshot under limbs.

I have one equipped with 6- to 8-pound test line that I used to throw a Marathon popping bug without rubber legs. The reason I use a plain popping bug is it's easier to throw. A legged bug is harder to throw. I paddle my own boat, by the way, and sit in the front of the boat and flip the paddle with one hand, scull with one hand and flip with the other. At times a redbreast will hit a popping bug. The time of the year is more important than the time of the day. Sometimes redbreast'll feed throughout the day. Usually you start using your popping bug when the corn in the fields gets about knee-high. And that's usually a week or two after strawberry season's over in this area around here.

I also take a bream buster with 8-pound test line and a cork and #6 bream hook and a BB for a weight and I take a



Tranquil late-fall scene along the South River is typical of many stretches of the slow-moving, warm-water streams where redbreast may be found.

container full of crickets — we call that throw gear. You throw it and leave it for only three seconds and then pull it in. I'll fish a cricket on that and fish anywhere from 6 inches to the bottom. Most of the time when the river's rising you need the river in its bank before you can catch any redbreast on a float trip. I usually float down; if you float down five hours, I put the little 4-horse Johnson on it and come back up. It takes you one hour to come back for each five hours you float down.

At times I use a trick: I take the lead off completely. Sometimes a redbreast will hit the bait without a lead on it. It sinks slower or stays on the top. Sometimes I use a piece of a night crawler about an inch long, and if you hook that in the middle, it looks like a caterpillar falling in the water. Caterpillars fall along the river all year long, and redbreast will fall right on them. I always take the three baits. I take the spinner bait, I take the popping bug and I take crickets or worms and use with a cork throw gear and that's the same thing I take bream fishing in a pond.

The best day I ever had redbreast fishing, I caught 105 one day in the Lumber River. I fished from daylight to 8:30. They bit on bugs. This was in May, a very good time usually to catch them on a bug. When the corn's kneehigh, that's the time to start tearing them up with a bug. You can watch different things: for instance, crappie'll spawn when the dogwood's in full bloom and the herring'll run on a full moon in February. When your cypress needles turn brown, that's a sign generally that the redbreast season is over. Then I turn to bass.

I would say that different streams down here have different strains of redbreast. The Little River redbreast is smaller and tastes different from a Lumber River redbreast. The Northeast Cape Fear redbreast is a shorter redbreast and does not have the flavor nor the texture of say a Lumber River or a South River redbreast. A South River redbreast even differs from a Lumber River redbreast in length and thickness and in taste.

I would go so far that I can tell an Edisto River redbreast, say, from a Northeast Cape Fear redbreast. Edisto is in South Carolina. It's a famous redbreast stream. It's got two forks, north and south, that come together around Orangeburg and then it goes on down into the ocean near Jacksonboro. I've fished it all the way down to Jacksonboro on in to the tidewater. I've fished in all of it at one time or another.

In South Carolina the redbreast used to bring a fancy price. People prized themselves on the taste of redbreast there. You couldn't take a redbreast from Northeast Cape Fear down there and sell it for anything. I know one fellow there that raised 11 children fishing for redbreast and never left the county.

The Waccamaw River was the best that I ever saw for redbreast, the best I ever saw. It was good until they had low water back in '49, I believe it was, 1949. You could walk across Waccamaw River where Highway 9 crosses South Carolina and not get your socks wet, it was that dry. Fishing has never been the same in Waccamaw River since. Very few fish have been caught. To give you an idea of how good it was, I fished one afternoon and caught 12 redbreast that weighed from 1 pound, 2 ounces to 1 pound, 4 ounces. The limit in South Carolina at the time was 25 and still is. To tell you how big the fish were, I went to eat one one night and the fellow pulled up his trap, he had one redbreast and one bream in it. He said, "How many do you want to eat?" I said, "I'll take both of those." We fried them, and I started to eat that redbreast. I got through with the redbreast and started on the bream. I was full after I had eaten the one redbreast. But I didn't say anything, I kept on eating and it floundered me so, I went over to the beach and set up on the porch there with my feet up about three hours. Those two fish, they were big nice fish. You don't see that anymore, fish like that.

Down there where the Lumber and Little Pee Dee come together in a one-mile stretch there's 86 houses now. When I started going there, there was one cottage along that stretch of the river. Now there's 86 — I counted them — and all that sewage is going in there. I won't go back in there again.

I'd say for the future if a man doesn't have a private pond or a club, he's out of luck. You can certainly support a fishery if you'll cooperate, turn back your bass, not keep all the fish in the world. If you turn them back, you can catch them again many times. You can fertilize a 10-acre place, a 4-acre place or a 30-acre place and have all the panfish you want.

Fishing is a good wholesome sport. I take a lot of young fellows fishing, teach them a lot of things. I like to stock ponds, too. It makes places for people to enjoy. Sometimes I think I fish too much but if I didn't fish I don't know what else I'd be doing. Getting into some meanness in all probability.

I saw a fellow not long ago, a neighbor of mine and I thought he was a fisherman, and I said, "Bud, you still fishing?" He said, "Hell, I don't like to fish. I was just using that as an excuse to get off and drink. I never did like to fish." Here, and I thought that fellow had been a fisherman all his born life! ⊠

Carolina Profile *is a periodic feature in* Wildlife in North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.*

Photography by Ken Taylor

the Bamboo Tradition

Building fine, split-cane flyrods is a rare art in the Southeast, but one Raleigh craftsman would like to change that.

by Jim Dean

Somehow it seems fitting that Erick Umstead's obsession is being pursued at the top of three flights of shoulder-wide stairs in the tiny room of a house built in 1891. Here, in the middle of Raleigh's oldest neighborhood, Umstead is following a tradition that traces its lineage back many years.

That obsession is building fishing rods — not out of fiberglass, graphite or boron, but of bamboo. And not just any bamboo, but tonkin cane imported from a small province in China. Umstead's rods — all flyrods — are built by hand from six strips of cane planed to tolerances of 1/1,000th of an inch or closer, and glued into hexagonal tapers that are delicate, yet powerful; beautiful, yet fishable.

Standing in his shop one warm day this past fall, I was struck by the appropriateness of the immediate surroundings, and also by an unlikely contrast. Raleigh — indeed, the Southeast — is hardly the place you'd expect to find this ancient craft practiced. The Northeast has been the center of bamboo rod-making since Samuel Philippe built the first six-strip rod of Calcutta cane in 1859. Since that time most cane rods have been built in this country by artisans who cut their teeth on northeastern trout streams.

Mention bamboo to a southerner, and he is more apt to think of a $1.25 cane pole used for bluegills than he is a hand-crafted rod built to catch trout, salmon or bass. Indeed, with the advent of modern rod-making materials it is remarkable that a market still exists anywhere for rods that may require several weeks of labor and cost new anywhere from $400 to $2,000 — sometimes even more if they're antiques made by certain early rodmakers.

Umstead admits that he can't exactly explain his interest in building such rods. "I used to like to fly fish for bluegills when I was a kid going to high school in Nashville near Rocky Mount, and I like to work with wood," he recalled, "but I had never even heard of a split bamboo rod until 1978 when I was a graduate student in zoology at N.C. State University.

"I'd begun to trout fish a little in our mountains, and somebody told me about a lady in Willow Springs who had an old bamboo rod for sale for $50," said Umstead. "I couldn't understand why someone would pay that much for a fishing pole made of wood."

The seed, however, had apparently been planted, and a couple of years later, Umstead checked a book on bamboo rodmaking out of the library. Early in 1982, he built his first rod — a handsome little 7-foot flyrod.

"The whole thing was almost a laugh," he recalls with a chuckle. "I still hadn't actually seen a bamboo rod — only photographs — and I spent about 100 hours working on that first rod in an unheated room. I nearly froze. I'd work for awhile, then come into the heated part of the house to warm up."

Given the circumstances, one might expect that first rod to have been a truly amateurish effort. It's not. In fact, you can compare it with the 7- and 8-foot rods he's built since and find little difference. The tapers are exact, the gluelines virtually

invisible, and the finish flawless. Put them alongside other bamboo rods from such well-known makers as Leonard, Orvis or Garrison, and you are struck with the obvious similarities.

On the afternoon I visited Umstead's shop, we took several of his rods downstairs to a nearby lawn, fitted them with reels and lines and tried them out. They performed beautifully.

Any experienced fly fisherman who has handled a number of bamboo rods will tell you that cost and the reputation of the builder are not always reliable guides to quality. There are exceptional bamboo rods, and poor ones.

"I wouldn't hit a cat in the butt with some of the so-called fine bamboo rods I've had an opportunity to use," one experienced fisherman told me several years ago, "but if you ever get your hands on a really good one, it's a truly memorable experience. Graphite, boron — even fiberglass — are marvelous materials for making rods, and the best graphite and boron rods are lighter and will throw a longer line than bamboo. But a quality bamboo rod has a feel all its own that nothing else can duplicate. And there is also the extra pleasure in owning a traditional, handmade rod."

Could someone seriously interested in building a bamboo rod hope to duplicate Umstead's achievement? And if so, how would he go about it? Those were questions I asked Erick.

"It takes a lot of patience, of course, and a person needs to be handy with tools and have a knack for working with close tolerances and fine detail," Umstead said. "But yes, I think it's possible for someone with reasonable skill to build an acceptable bamboo rod.

"The first step I recommend is to get one of the two or three books that have been written about bamboo rodmaking," he said. "The best of these is unquestionably Edmund Everett Garrison's *A Master's Guide To Building A Bamboo Fly Rod.* Garrison is truly one of the acknowledged masters, and the rods he made before his death are among the most valued collector's rods around. He died before he finished his book, but his apprentice, Hoagy B. Carmichael, finished it. Carmichael now builds high quality rods himself, but outside the angling fraternity, he's probably best known as the son of the man who wrote so many fine songs, including 'Stardust.'

"If you're still interested in tackling a rod-building project after reading Garrison's book, you'll need to buy or have a machinist make you some steel planning forms," said Umstead. "These can be quite expensive, costing $200 or more, but the rest of the tools — planes, files and so forth — can be bought at any good hardware store, and you can make most of the other items you'll need.

"Of course, getting high quality tonkin cane may be a bit of a problem," said Umstead. "I order mine from New Jersey, but not all of it is top quality. I've even written the Chinese Embassy in Washington and the Peoples Republic of China to try to find more reliable supplies of cane."

When making a rod, Umstead follows the basic steps used by other rod makers, especially Garrison. He first splits rough strips from a culm of cane, then straightens the cane by heating it over an alcohol lamp. The nodes (natural joints) in the bamboo are filed, and the strips are then planed to a rough taper. After heat treating the cane, he planes each strip again to the exact taper he wants. With an adjustable metal planing form, he can choose proven tapers used by other rod makers, like Garrison, or experiment with his own.

"Planing the cane is perhaps the most exacting part of the process," said Umstead, "and it's also a bit dangerous. Bamboo is tough and resilient, and when it's planed, the edges are as sharp as razors. I use rubber finger cots as guards, but I've still had some nasty slices."

After the strips are tapered, they are carefully glued together and wound with string to hold them while they dry. Umstead then checks closely again for straightness. After that, it's a fairly simple matter to add the metal line guides, finish (usually varnish), and fit the rod with a reel seat and handle.

"You can buy finished handles and reel seats, but I like to turn my own cork handles on a lathe so that I can select the best quality cork, and I also turn the reel seat out of some handsome wood like burled cherry," said Umstead.

With Umstead's obsession for perfection, it seems odd at first to hear him admit that he still has not spent much time studying the finished rods of other quality rod makers. "It's sort of like working in the dark," he confessed, "but it has not been entirely a matter of artistic isolation. I've simply been too poor to travel and visit other makers."

Even so, by working alone, he is following in the best maverick tradition of virtually all the fine bamboo rod makers — living or dead. Men like Garrison, Pinky Gilliam, Jim Payne, Hiram Leonard, Paul Young and most of the others have been essentially loners who took great pride in developing their own techniques. And in most cases, what might have begun as a

Strips are split from Tonkin cane imported from mainland China and the nodes (joints in the cane) are filed off. From this point on, the craft of making a rod becomes more difficult and exacting.

Before the demanding task of planing can begin, each of the six cane strips is straightened over an alcohol lamp (below). The planing of the strips to tolerances of one-1,000th of an inch takes a sizeable portion of the 80 to 100 hours Umstead estimates it takes to complete a rod. The chore of planing also involves some risk since the cane's edges become as sharp as razors. When the six strips are glued together, a special jig wraps string in opposite directions to hold them until dry (see wrapped rod blanks in photo below).

hobby eventually became a profession.

"When I built that first rod, I had no plans to make rods for sale," said Umstead. "But I've changed my mind about that. I've been pleased with the rods I've built, and I guess building them is in my blood now. At least, I want to give it a try."

Recently, Umstead left his job with the N.C. Department of Agriculture where he had worked for three and a half years investigating incidents of pesticide misuse, and monitoring marketplace products as a pesticide specialist.

"Building rods as a profession appeals to me because I can turn out something that I can take pride in — something that a serious fisherman can hopefully take pleasure in owning," he said. "And then, such work would give me more time to spend with my wife, Amanda, and perhaps permit me to see more of my 16-year-old son, Bryan, who lives in Arizona."

Umstead and his new wife — Amanda Bosch — were married in 1980, and together they have recently finished putting up a cabin in the Elk Creek Valley of Grayson County in Virginia. Eventually, Umstead would like to move his rod-building operation to the cabin, but for the meantime he plans to remain in Raleigh. Those interested in discussing the possibility of ordering a custom-made rod can write him at 612-A North Blount St., Raleigh, N.C. 27604 or call him at 919-833-8249.

"I'm definitely going to try to make a go of rod-building," said Umstead, "and if it works out, who knows? I may even get a chance to do a little more trout fishing than the past few years."

One things is certain, when Umstead wades a stream and curls a flyline over the sparkling water, he'll be holding a rod that will be the envy of any fisherman. ⊠

Emphasizes Traditional Hunts

New Regulations Adopted For Canvasbacks

Written and Edited by Mark Taylor

The canvasback has always been considered the "king of ducks" on the East Coast. Connoisseurs of wild game always claimed that canvasback nourished on wild celery offered the best eating. The canvasback was the staple duck of the exclusive hunting clubs that bordered Currituck Sound early in this century, and "cans" were eagerly sought by market hunters who plied the waters of Currituck Sound and Chesapeake Bay. Before market hunting was outlawed in 1918, a pair of canvasbacks fetched a hunter anywhere from $2 to $7 depending on location and market conditions — a good weekly wage at the time.

North Carolina hunters will once again have the opportunity to hunt canvasbacks in certain areas. A special, 10-day canvasback season with liberal bag limits will be held from January 10-20 in that portion of Pamlico Sound designated as coastal fishing waters within two miles of the mainland extending from Long Shoal Point on the north side of the Long Shoal River to that point of land near Whartonville on the north side of Broad River known as Piney Point and upstream in the Pamlico River to the Aurora-Belhaven ferry crossing. The daily bag limit, which will count as part of the regular bag limit for ducks, will be four canvasbacks, and only one may be a hen canvasback. Hunters will also be required to carry a free canvasback permit which is available from the N.C. Wildlife Resources Commission.

"This special season incorporates a change in concept in waterfowl hunting," said Grady Barnes, section manager of research and regulations for the Division of Wildlife Management of the N.C. Wildlife Resources Commission. "In the past, the season for canvasbacks has been closed in the coastal waters where the birds winter in large numbers. However, the canvasback population is small but stable, and can withstand a limited, carefully regulated harvest. Rather than allow a hunter to take only one canvasback throughout the regular duck season, we felt it would be better to have a special, shortened canvasback season with liberal bag limits that would make it worth a hunter's trouble to hunt canvasbacks in the traditional manner. Waterfowl hunting has a rich heritage, and this special canvasback season is attempting to preserve part of that heritage and offer sportsmen a quality hunt.

"Traditionally, hunting for canvasbacks involves a lot of work. The birds winter well away from shore in rough, coastal waters. Large decoy spreads are needed, and often hunters set out several hundred decoys to hunt canvasbacks. It wasn't worth a hunter's trouble to do this for only one canvasback daily, but the special season with a more liberal bag limit changes things. The harvest of canvasbacks will be the same, and waterfowl hunters will have an opportunity to enjoy a great hunt instead of just having an occasional canvasback in the bag."

Today, the canvasback population is estimated at 560,000 birds, much less than what it was at the turn of the century. Loss of breeding habitat has taken a serious toll of canvasback populations. These birds nest in the prairie potholes of the upper mid-western United States and southern Canada. As these potholes were cleared and drained for agriculture and other uses, canvasback populations declined. The loss of coastal wintering habitat has also changed the habits of the birds. More canvasbacks now winter in the Mississippi valley than in the past, and biologists feel that this shift was caused by pollution and loss of wetlands in Chesepeake Bay. About 40,000 to 50,000 canvasbacks usually winter in North Carolina waters, mostly in Pamlico Sound.

"Loss of habitat and drought are the two factors which influence canvasback populations," said Barnes. "Drainage of prairie potholes for agriculture and other uses has definitely hurt canvasback populations over the long run. Most other waterfowl species nest further north, and aren't as susceptible to man's activities. Drought also dries up these nesting areas, and causes wide fluctuations in canvasback populations.

Barnes adds that as long as adequate breeding habitat remains, sportsmen should be able to hunt canvasbacks. However, the populations are low and vulnerable to over-harvest.

"This hunt is a serious attempt to allow a harvest of a minor waterfowl species in a traditional manner," he said. "The experimental hunt will be closely monitored for three years to ensure that sportsmen obey regulations. If serious problems arise and the hunts are cancelled, sportsmen may not expect another canvasback hunt for many years. The future is in the hands of the hunter."

Canvasback permits are available from the N.C. Wildlife Resources Commission, Division of Wildlife Management, 512 N. Salisbury St., Raleigh, N.C. 27611.

Jack Dermid

New Season For King Can: *Banding studies have shown that canvasback populations are small but stable, and this year a season will be held in coastal North Carolina after several years of closure. The season will be short with a four-bird bag limit (including only one hen).*

Programs Honored

Two educational programs of the N.C. Wildlife Resources Commission recently won North American awards in an annual competition sponsored by the Association for Conservation Information, a professional organization of communicators within natural-resource agencies and conservation organizations in the United States and Canada.

Wildlife In North Carolina magazine tied for third place for best magazine with *Michigan Natural Resources* magazine, which is produced by the Michigan Department of Natural Resources.

The Wildlife Commission finished first in the competition for the best news program. Submitted was the "Wildlife Newsletter," a bi-weekly press package which is sent to all outdoor writers, daily and weekly newspapers, and television and radio stations in the State.

A regular contributor to *Wildlife In North Carolina,* Joel Arrington, outdoor editor for the N.C. Division of Travel and Tourism, was recently honored for a fishing story published in the May 1982 issue of *Wildlife In North Carolina.* His article about drum fishing, entitled "Seeing Red," won first place in an outdoor-writing contest sponsored by the Shakespeare Fishing Tackle Company.

"We are very pleased to win these awards," said Sid Baynes, chief of the Wildlife Commission's Division of Conservation Education, which produces the award-winning magazine and news program. "We're deeply committed to keeping the public informed on wildlife and environmental issues through quality programs."

Takes A Sharp Eye

"Bucks-Only" Rabbit Hunting

I didn't bite — at least not like I did the time when I was told of a bird dog that could "charm" a quail, or the Brunswick County alligator that broke ice in a pond so he could go for a swim.

No one, not even Carl Betsill — a well-respected, small-game biologist with the Wildlife Commission — was going to tell me that anyone could practice "bucks-only" rabbit hunting. Heck, it's hard enough to tell that a brown blur is a rabbit when it breaks out of a briar patch in front of a pack of yapping dogs — much less that it's a Joe Rabbit or a Jane Rabbit. Besides, as anyone who has ever had a pet rabbit knows, unless it comes from the store with a pink or blue ribbon around its neck, the only way to tell its sex is to place it in a pen with another rabbit and see what develops. If nothing does, you've either got two male rabbits or two females — take your pick.

"Bucks-only" rabbit hunting — you've got to be kidding!

"I tell you Ed, I've seen it with my own eyes," Carl insisted. "There's this guy, right here in North Carolina, who is a bucks-only rabbit hunter. If you'd just give me a chance to explain . . ."

With the greatest of reluctance (and visions of night snipe hunts dancing in my head), I let biologist Betsill weave his tale. At the end, I was convinced that he was "telling it for the truth," as we say in Halifax County.

There is a "bucks-only" rabbit hunter in North Carolina, but he has a gimmick. It's really quite simple. You don't shoot the rabbits — you catch them by hand.

It seems that the proponent of "bucks-only" rabbit hunting is Donald Belk of Salisbury. Belk has placed a number of 4-foot lengths of 4-inch plastic pipe under brushpiles and in other areas on his land where rabbits like to hide. When a rabbit is flushed by the dogs, it will eventually return to the area where it was jumped and will often take refuge in one of the plastic pipes. Some swift hand and foot work by Mr. Belk quickly gets the critter in hand, and its sex is immediately determined by his sharp and discriminating eye. If the rabbit is found to be a female or doe, it is turned loose, hopefully to breed and also to perhaps be chased another day. The buck rabbits are destined for the frying pan.

Biologically, there would be little difference in the overall rabbit population whether females were harvested or not. The population of rabbits in an area depends more on habitat type and cover than on hunting pressure. However, one can't help but admire a person's resolve, as Jerry Clower would say, to "give ever'thin' a sportin' chance."

— Ed Jenkins

Wildlife Endowment Fund Status Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status On September 30, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	6,165	$1,800,865
Lifetime Hunting License	68	$11,586
Lifetime Fishing License	267	$43,239
Lifetime Subscription to Wildlife In N.C.	198	$21,791
Contributions		$29,689
		Fund Total: $1,907,172

A Matter Of Taste

Roast Woodcock Aren't For Everybody

John Widman

Early January is my favorite time for "bird" hunting in Carolina. To most Tar Heel hunters, "bird" means quail — but you might want to expand that definition to include woodcock as well.

On the table, woodcock get mixed reviews. Some wild-game enthusiasts consider them unmatched as a dinner entree, while others disagree. There is no doubt that the flavor of woodcock is distinctive, and the only way to determine if you like them is to try one.

True woodcock connoisseurs dry-pluck their birds. This retains the skin, which holds in valuable moisture during cooking and contains a layer of fat that adds much flavor. Other hunters, however, simply "pop out" the breasts — as you do with doves. The breast contains most of the edible meat on a woodcock.

Like ducks and doves, the breast meat of a woodcock is dark, and many consider it best when cooked rare. I prefer it medium-rare — a 140-degree thermometer reading with a pink center suits me fine. You may want to cook it a little more than that, but be sure not to overcook. Woodcock quickly becomes dry, tough, and tasteless when overdone.

Try the following recipe for roasted woodcock. You might find that the sidetrips you make to bottomland thickets become more frequent.

ROAST WOODCOCK

Pluck and draw or split the birds to clean. Wash birds in cold water, drain and pat dry with a towel. Remove any shot, and trim damaged parts. Start a fire in a fireplace or outdoor grill, and build up a good bed of coals.

For drawn birds, insert a marble-sized chunk of hard butter or margarine, or a small curl of fat bacon, inside the cavity of each bird. Wrap a thin slice of bacon around each bird, and secure with a toothpick. Season lightly with black pepper, marjoram, and minced parsley. Then, fasten the drawn bird onto a spit, rub with butter, and broil over the coals for 12 to 15 minutes, depending on your taste. Turn and baste with melted butter almost constantly.

For split birds or breasts, rub all over with butter and season lightly with black pepper, marjoram, and minced parsley. Then, place the birds in a hinged wire grill, and hold them over the hot coals (skin-side up) for a few minutes to sear the underside. Baste the tops with butter, and turn to sear the skin-side. Baste almost constantly, and turn frequently until the birds are golden and tender. Split birds and breasts broil quickly, often in 8 to 12 minutes or less, so be careful not to overcook.

Serve the birds hot off the grill with bread sauce on toast and a side dish of steamed, buttered broccoli. A robust red wine goes well with this dish.

BREAD SAUCE

1 cup fine, dry, white-bread crumbs
2 cups milk
1 medium onion
3 tablespoons butter
salt and pepper

Sift the crumbs through a coarse sieve, then sprinkle them over the milk in a sauce pan. Set the remaining coarser crumbs aside. Add the whole onion to the milk, and scald over low heat for 12 minutes after a skim forms on the milk (use a double-boiler, if necessary, to prevent scorching). Remove onion, add one tablespoon of butter, and salt and pepper to taste.

Heat the remaining butter in a sauce pan. When it is hot, add the remaining coarse bread crumbs and fry to a golden brown, stirring quickly to prevent scorching. Remove from heat.

Put the sauce in a gravy boat and sprinkle the browned crumbs on top. Serve immediately over woodcock on toast.

— *Curtis Wooten*

Governor Hunt Receives Print

Kay Frazier

A Boost For Waterfowl: *North Carolina Governor James B. Hunt Jr. recently received a signed and numbered, limited-edition art print of the first North Carolina voluntary waterfowl stamp. Sales of the stamp and art prints have raised approximately $400,000 for waterfowl conservation in North Carolina. From left to right are Richard Plasschaert, a well-known Minnesota wildlife artist who painted the stamp, J. Robert Gordon of Laurinburg, chairman of the N.C. Wildlife Resources Commission, Governor James B. Hunt Jr. and Vernon Bevill, executive director of the Wildlife Commission.*

"Ask A Biologist"

Quail Stocking Not The Key To Good Hunting

"Ask a Biologist" is a series of articles on wildlife management that appears periodically in *Wildlife in North Carolina.* The author is Carl Betsill, a Wildlife Commission biologist who specializes in the management of small game and urban wildlife.

Question: *I would like to improve the quail hunting on my farm. Would stocking quail help increase the population?*

N.C. Wildlife Commission

No Easy Answers: *Many bird hunters feel that stocking quail would improve hunting, but this is only a short-term solution at best. Improvement of habitat is the only means of making any real improvement in quail hunting.*

The Wildlife Commission receives many requests to stock quail from hunters and landowners. Most people are surprised to find that wildlife biologists generally discourage quail stocking as a wildlife-management practice. Much of this confusion arises as the result of two things. First, the Wildlife Commission has programs to stock deer and wild turkey, so why not quail? Isn't this discrimination against the small-game hunter? The answer is "no," because deer and wild turkey are stocked only in areas where there is suitable habitat and a lack of wild breeding stock — these projects are really attempts to restore populations of these species, and are not stocking programs per se. Biologists have always found that if there is adequate habitat for quail, birds from surrounding areas will quickly fill the void.

A second confusing point is the difference between stocking quail as long-term, wildlife-management, and for short-term, "put-and-take" recreation. Stocking alone has never worked as a long-term means to increase quail populations, and has more often than not even failed to provide efficient put-and-take recreation. The game-farm programs of the past serve as a good example. Many state wildlife agencies, including North Carolina, once operated game farms to raise quail for stocking in the field, ultimately hoping to increase the hunter's bag. Without exception, these stocking attempts were dismal failures.

Here is why. It's not unusual for 60 percent of the pen-raised birds to die within a month after being released into the wild. In fact, one study showed that of 360 quail stocked in the fall, only 28 percent could be located 45 to 60 days later. And by April, the statistics were even grimmer — only six percent remained. Survival from spring stockings was even worse.

There are techniques — such as flight conditioning, call-back pens, and feeding stations — that can reduce mortality in stocked birds. Under the best of circumstances, however, mortality is still high. With wild birds in good habitat, 70 to 80 percent die and are replaced through natural reproduction every year. If the habitat that you have stocked is so poor that native birds are unable to survive, there is no reason to expect pen-raised birds to do any better.

This put-and-take stocking of quail is not cheap, either. A good price for a flight-conditioned quail is $2.50. At that rate, it would cost the N.C. Wildlife Resources Commission about $1.5 million to increase the average hunter's bag by one bird. And this is assuming that all of the birds stocked were recovered by hunters, which may be the ultimate in wishful thinking. In reality, studies have shown that very few birds released in statewide stocking programs are recovered by hunters. For example, one state experimentally stocked 13,500 banded birds and offered a $100 reward for every band returned. Advocates of quail stocking were sure that this would bankrupt the agency, yet only 152 bands were returned. Tennessee concluded that after stocking nearly a half-million quail over a 12-year period, they were spending $180.71 for each artifically reared quail harvested by a hunter.

In spite of the high costs and excessive mortality, many people still choose to stock quail on their own lands. Some techniques have been developed in the last few years to improve the short-term survival of pen-raised birds. One technique which is used by many field-trial organizations is to stock a large number of 8 to 10 week-old birds about 4 to 6 weeks before the season opens. These birds are released quietly in groups of 10 to 15 birds, and food is scattered near the release site on a regular basis. This technique seems to reduce post-release mortality, and allows the birds to adapt to their new environment.

What is the alternative to quail stocking? Habitat development is the best answer — it's cheaper, more effective, and lasts longer. Quail require many different things within their home range — good escape cover, nesting and brood-rearing areas, and adequate winter food — and all of these needs may be met through habitat management. If any of these factors are missing, however, quail populations will suffer. Determining which factor is limiting quail numbers, and how this may be corrected, can be tricky. However, help is at hand. Commission wildlife biologists are stationed throughout the State, and these men are happy to work with landowners to improve the wildlife habitat for quail and other species on their lands. For the name of the wildlife biologist in your area, contact your local wildlife enforcement officer or call the Wildlife Commission's 24-hour, toll-free, Wildlife Watch Hotline at 1-800-662-7137.

Calendar Of Events

January 6-8
Pinehurst Field Trails in Hoffman. Contact Bill Andrews at 919-652-5752.

Mid-January
Black Mountain-Mount Mitchell Cross-Country Ski Challenge. Six and 10-mile races, call to check on snow conditions. Contact Robert Antozzi, Recreation and Parks, 225 W. State St., Black Mountain, N.C. 28711 at 704-669-2052.

January 20-22
Southeastern Brittany Field Trails at Hoffman. Contact Bill Andrews at 919-652-5752.

January 20 — February 4
Southern Farm Show at the State Fairgrounds in Raleigh.

Only $5

1983-84 North Carolina Wildlife Calendar

Six nationally known wildlife artists have contributed fine outdoor and wildlife paintings to the 1983-84 calendar. Their paintings are in museums and private collections throughout the country, and you've seen examples of some of their work in WILDLIFE IN NORTH CAROLINA magazine. This calendar is almost certain to become a valuable collector's item with such artists featured as:

- Bob Binks
- Bob Dance
- Cecil Eakins
- Larry Barton
- Duane Raver
- Lee LeBlanc

Calendars are $5 each; however, if you purchase 50 or more, we will sell them to you for only $4 each.

This is a project of the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the Wildlife Resources Commission to provide information, guidance and support for the agency's wildlife conservation programs. Proceeds from the calendar will go for these purposes.

Yes, please send me _____ copies of the North Carolina Wildlife Calendar. I have enclosed cash, check or money order for _____. We do not bill.

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Return form and payment to Chairman's Wildlife Advisory Committee, care of George Mason, P.O. Box 473, Dallas, N.C. 28034 or give the form to a member of the committee. Checks should be made out to the Chairman's Wildlife Advisory Committee.

Good Fireside Reading

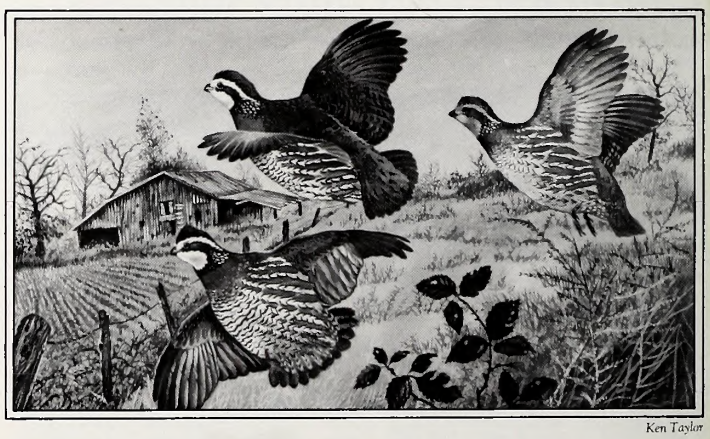
Covey Rises and Other Pleasures by David Henderson. 1983. Published by Amwell Press, 65 Old Route 22, Clinton, New Jersey 08809. Hardcover, 155 pp. Cost is $20, including mailing.

If you're seeking some in-front-of-the-fireplace reading for a cold winter's night, this book of essays by David Henderson is a fine choice. Although he is a native of eastern North Carolina, Henderson's subjects range far and wide including big-game hunting and fishing trips in Alaska and Canada and letters to his cousin Herbert, one of Bertie County's premiere quail hunters.

The book most definitely has a Tar Heel flavor, and dogs, birds and bass figure heavily. The author also has a marked fondness for duck hunting in the marshes of Currituck. While not a book of nostalgia, many of the essays deal with the hunting and fishing of the 1940s through 1960s when hunting was found close to home, birds and fish seemed to be more plentiful, and elbow room was taken for granted. For most of us, this state of grace no longer exists, as the author is quick to point out.

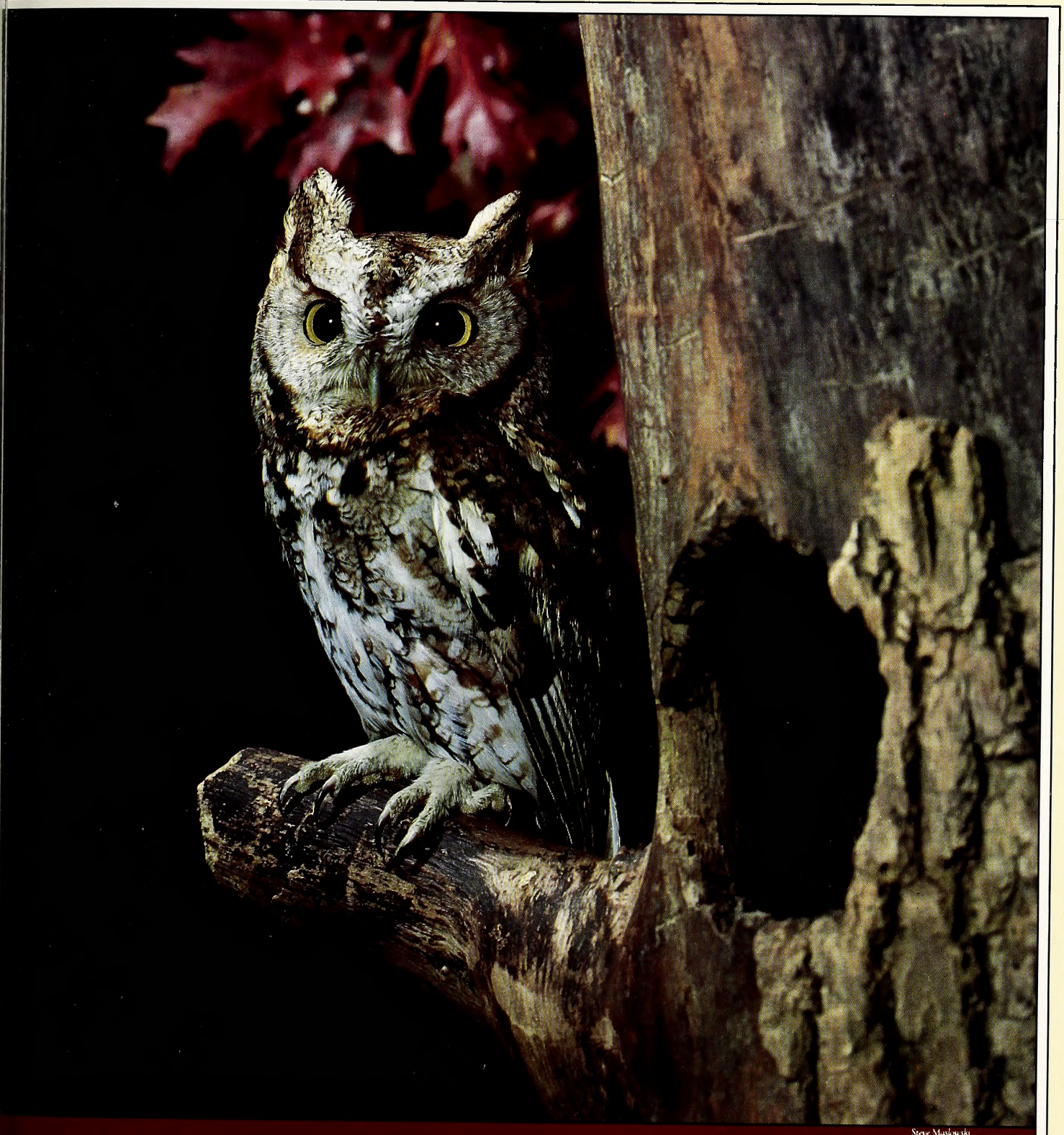
Covey Rises and Other Pleasures is handsomely printed in an old-fashioned format, and tastefully illustrated. Those who love field sports and all things southern will enjoy it.

A Boost For Wildlife



Ken Taylor

One For The Wall: *Prints of North Carolina's 1983 sportsman's stamp, created by well-known North Carolina wildlife artist Duane Raver, are still available. The print is 6½ by 9 inches, and orders for this time-limited edition will be accepted through March 31, 1984. The cost of the prints is $90. This print of North Carolina's first sportsman's stamp is expected to appreciate in value considerably in the future. A royalty from the sale of each print will be donated to the Wildlife Commission, and the proceeds will be used for wildlife conservation. These prints are not being sold by the Wildlife Commission, but are available from art dealers throughout North Carolina.*



Steve Maslowski

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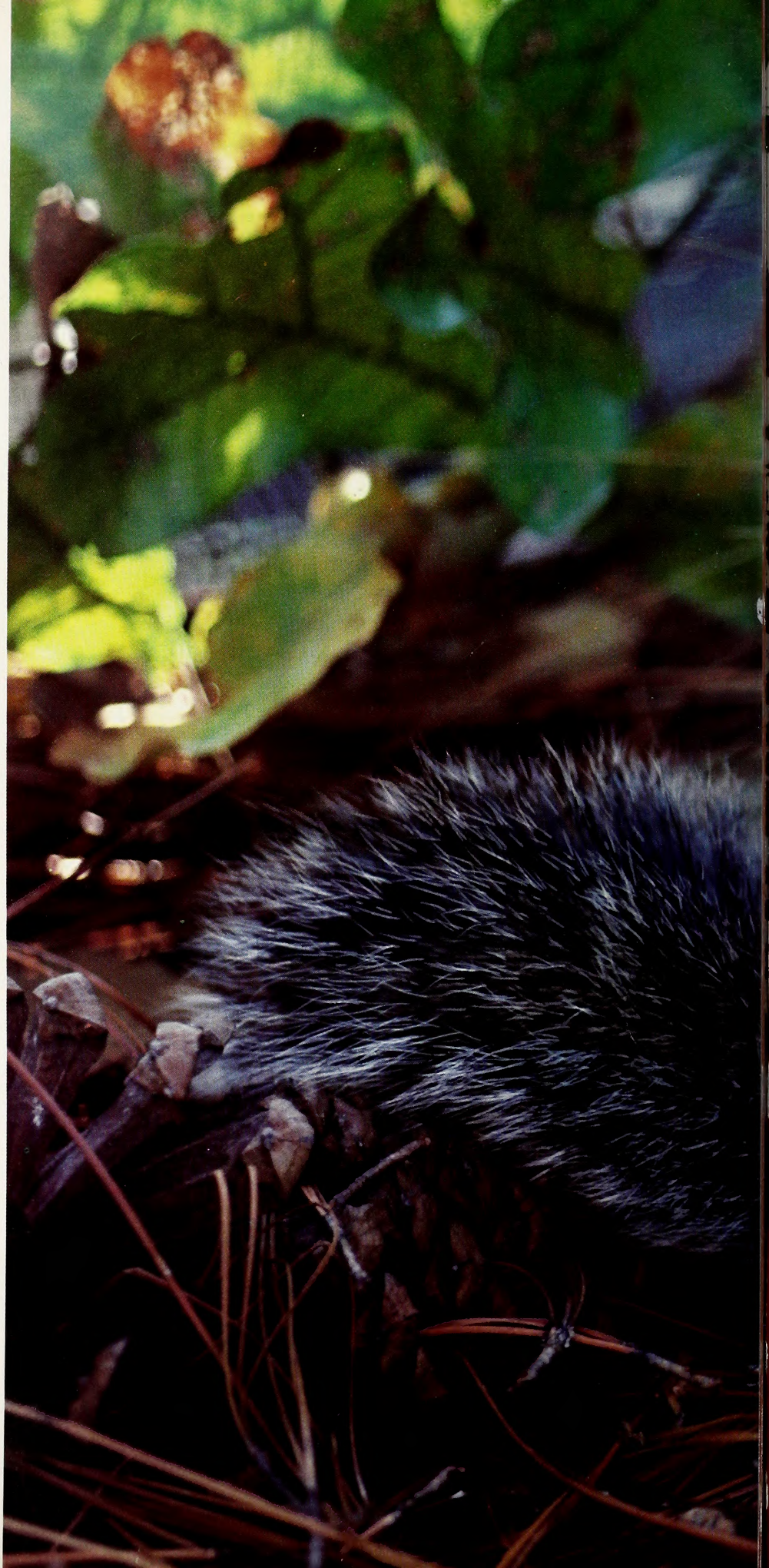

Biggest Bushytail

The wary fox squirrel is about twice the size of a gray squirrel, yet it is seldom seen.

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WILDLIFE IN NORTH CAROLINA

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They Always Went Out

by Jim Dean

Wash Wood, Penney's Hill, Caffey's Inlet, Kill Devil Hills, Chicamacomico, Little Kinnakeet, Oak Island. Not all the names are familiar, and many tourists pay scant attention to the weathered buildings that still stand at some of those sites. Yet, there was a time when these places, and others like them, were of great importance to those who lived on North Carolina's Outer Banks — and even greater importance to many who sailed past them in the treacherous shoals just offshore.

N.C. Archives and History

The station at Cape Lookout was typical of others along the Outer Banks.

It all began in 1847 when the United States Treasury Department formed a series of outposts along the Great Lakes and eastern seaboard states to try to cut down on the significant loss of life caused by countless shipwrecks. In 1874, the United States Lifesaving Service expanded its operations to North Carolina, and established seven lifesaving stations on the Outer Banks at Jones Hill, Kitty Hawk, Caffey's Inlet, Nags Head, Oregon Inlet, Little Kinnakeet and Chicamacomico. Within 10 years, the original seven had grown to 29 stations from Wash Wood near the Virginia Line to Oak Island south of Southport.

Until the early 1900s, the stations were manned only during the winter months when shipwrecks along the coast were most common. Because of their skill at launching small boats through a booming storm surf, local fishermen were selected to man the stations, and they were equipped with open, double-ended surf boats which were carried to the beach by horse-drawn wagons. Each station also had a Lyle gun mounted on a carriage which could be pulled to the edge of the surf where it could fire a projectile attached to a line. If the wreck were within 500 yards of the beach, the Lyle gun could fire a line over the wreck, and the crew aboard ship would haul a 3-inch rope to the vessel and secure it. Using a breeches buoy — a canvas seat hung from a life buoy — the crew could be brought to safety one at a time while dangling just above the pounding waves.

Even more spectacular were the rescues that necessitated the launching of a boat into a violent surf, especially since the boats were powered only by oars until the early 1900s. The daily logs kept by the keepers of the lifesaving stations are filled with accounts of daring rescues successfully made under the most hazardous conditions. Indeed, the credo of the present-day U.S. Coast Guard is thought to have originated when one station keeper — possibly John Allen Midgett Sr. — was asked whether he planned to attempt a rescue during a particularly violent storm. "We're going out," he is said to have replied testily. "The regulations say you have to go out. They don't say anything about coming back."

Indeed, the history of the lifesaving service is inseparable from the history of the Midgett family. No one is certain exactly when their forefathers arrived, but surnames like Midgett, Midgette or Midyett have been prominent on the Outer Banks for over two centuries. Because of their seamanship, many Midgetts served at lifesaving stations, and during the 78 years the Chicamacomico Station was in service, all three keepers and most of the crew were part of this remarkable family. Bannister Midgett III served as keeper at Chicamacomico (now Rodanthe) from 1879 when the station was completed until 1928 when he died and was succeeded by John Allen Midgett Jr. who served as keeper until his death in 1938. Captain Levane Wescott Midgett was the third and final Chicamacomico keeper.

Joe Mobley, a research historian with the N.C. Division of Archives and History, has spent years gathering information on the lifesaving stations, and he believes that of all the rescues made by lifesaving teams at the 29 stations, the most spectacular occurred while John Allen Midgett was keeper at Chicamacomico.

On August 16, 1918, the British tanker *Mirlo* with a crew of 52 was lumbering around Cape Hatteras headed north towards Norfolk. At 3:30 that afternoon, the commander of a German submarine, U-117, spotted the tanker and issued the order to open fire. A torpedo caught the *Mirlo* amidships about seven miles off the beach. Leroy Midgett was manning the lookout tower at Chicamacomico and spotted the first of three powerful explosions. He passed the word to "Captain Johnny," and after three unsuccessful attempts, a motor-powered surfboat was launched through heavy breakers.

Three of the *Mirlo*'s lifeboats had escaped the sinking wreck and flaming gas and oil that covered the water, but a fourth lifeboat had capsized in the midst of the inferno. Skillfully, Captain Johnny guided the crew of his wooden surfboat through the flames and rescued six trapped sailors. For hours, the lifesaving crew transferred survivors from lifeboats to the surfboat and carried them through the raging surf, finally beaching with the last load six hours after the torpedo struck the *Mirlo*.

The British government awarded gold lifesaving medals to the crew of the surfboat, and some years later in 1930, the U.S. Coast Guard presented Captain Midgett and his crew with the American Cross of Honor — only 11 have ever been awarded, and six belong to Midgett and his crew.

Today, the U.S. Coast Guard carries out the services once provided by the Lifesaving Service, as well as many other duties. But the tradition of heroism exemplified by the Midgetts and others who manned the 29 lifesaving stations has not been forgotten. In 1972, a new cutter was christened *Midgett* in honor of the men who always "went out," regardless of whether they expected to come back.

February, 1984
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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Front Cover *A Labrador retriever scans the dawn sky looking for incoming waterfowl. This is one of many fine photographs taken by Ken Taylor. Some of his other photographs are featured in this issue.*

Back Cover *When the first rays of sunlight appear, few scenes warm a waterfowl enthusiast's heart more quickly than the sight of ducks in the marsh. Photograph by Ken Taylor.*

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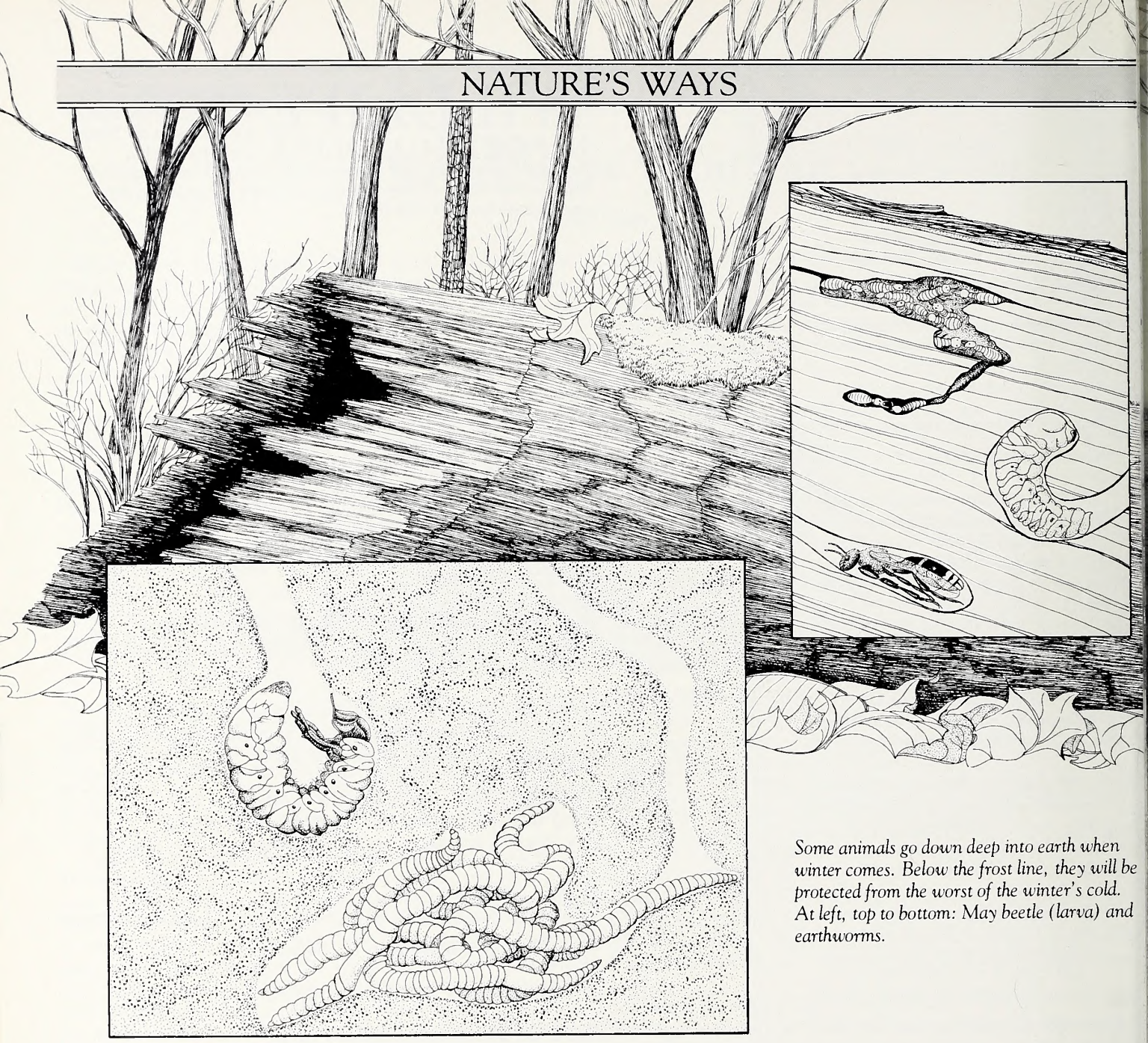


Some animals go down deep into earth when winter comes. Below the frost line, they will be protected from the worst of the winter's cold. At left, top to bottom: May beetle (larva) and earthworms.

Snug Bugs, Cozy Caterpillars

written and illustrated by Carol Lerner

If you are outside on the first warm days in early spring, you may be surprised to find insects flying about. Perhaps you will see a bee or some small flies. They have been out of sight for the long months of winter, yet suddenly they are back, full grown and busy. Where have they been all this time?

Of course, many insects die after laying eggs that will hatch next spring, but some actually survive the cold weather. It shouldn't surprise you that insects have many ways of spending the winter. A few insects migrate to warmer places, just as many birds do. The best-known example of this is the long-distance flight of the monarch butterfly.

But most "migration" among the insects is for short distances. Usually they move downward toward the earth to find protection from the cold. Those which live in the plants in the summer may move down to the bottom of the dead stems and find a shelter there. Or they may burrow under the blanket of the dead plant litter, or move into the upper earth. Animals which usually live in the upper inches of the earth, such as earthworms and some ants, will burrow deeper before the ground freezes.

Most of these animals hibernate. Just as with the mammals, their bodies will change before beginning the winter sleep. They will store up fat and lose some of their body water. Some will go into a sleep as deep as a woodchuck's. Others, like the mosquito, awaken quickly whenever the temperature goes up.

But insect hibernation has many more forms than mammal hibernation because insects have a very different life cycle.

NATURE'S WAYS

Many insects and other small animals die before the cold of winter sets in, but others have evolved ways of surviving the severe weather. Hibernation is one way. A dead log may shelter many kinds of hibernating insects in winter. At left, from top to bottom: termites, wood-boring beetle (larva), and white-faced hornet queen.

Insects hibernate in different forms as well as in different places. Hidden beneath the leaves and other dead plant materials, insects pass the winter in many different stages of their life cycles. At left, top: wooly bear caterpillar (larva) and adult ladybugs; bottom: grasshopper eggs and adult mourning cloak butterfly.

Insects go through a *metamorphosis* as they grow. Some insects hatch from the egg looking much like small adults. As they grow, they shed their skins several times. Finally after the last shedding, they have wings and are adult. This is called gradual or incomplete metamorphosis. Grasshoppers and termites are examples. Other insects change their whole appearance three times after hatching. First the insect is a larva (a caterpillar is one example). Then it becomes a pupa. Finally the insect becomes a full-grown adult, such as a moth, in our example.

Many kinds of insects will live through the winter only as *eggs.* After eggs are laid, all the adults die. This is true of the katydids and many grasshoppers. These, and the crickets, are insects which go through gradual metamorphosis. Some other grasshoppers hibernate as partly grown animals.

Some other insects spend the winter months as hibernating *larvae.* Perhaps you have found a woolly bear caterpillar in the cold months, hidden under a warm blanket of fallen leaves. Most dormant larvae are much better hidden, of course. The May beetle larvae are deep in the soil. Some fireflies hibernate as larvae in rotted wood or leaves.

Some large moths spend the winter as a *pupa,* in a cocoon. The *Promethea, Cecropia* and luna moths are examples. The *Cecropia* is the easiest kind to find because it is attached to the twig of a tree or shrub. The luna cocoon is wrapped in leaves and lies among the dead leaves on the ground. Again, most hibernating pupae are better hidden than these — in rotten wood, in dead vegetation, under tree bark, or in the ground.

The insects we see on the first warm day of spring are probably some of those who spent the winter as *adults.* These include many beetles, flies and bees.

Think about all these hidden animals around you next time you take a winter walk. Life is everywhere, just waiting for spring. ⊠

Cabin Fever Crappies

Fishing for crappies on big lakes is one of the best ways to break out of the winter doldrums. Here's how.

by Terry Shankle

Photography by Terry Shankle

It was cold, even though the sun had been up for several hours. It was not the same cold you feel when you crank the car in the morning, run out to get the morning paper, or realize your jacket is a little light for the day. The cold I was experiencing was a bone-chilling, close to water, windy cold — the kind that stiffens fingers, and does peculiar things to the normal functioning of the lower jaw. And my feet — I hadn't felt them for some time.

High, thin, winter clouds blocked much of the sun's intensity, and the northwest wind was piercing, but the most obvious reason for the cold was the fact that I was riding in an open boat at 25-miles per hour. But so what — only a day separates late winter from early spring.

I was on Lake Norman in late March in a 15-foot outboard. My companion, Hugh Morris, and I were after early season crappies. Being retired and living on Lake Norman gives Hugh ample opportunity to fish, and over the years he's developed a wealth of knowledge about the lake. This fact, I told myself, meant that it was just a matter of time until we found a spot where the crappies were hungry.

Hugh backed off the outboard's throttle as we entered a cove. What a relief! Now I could get off the floor of the bass boat. We slowed to an idle as Hugh switched on the depth finder. It whirred softly as its circular screen lit up with a fuzzy red light.

"That's the bottom," Hugh said, as he pointed to the red light on the screen. "The water here is 40 feet deep. Now to

line up on the markers. You see that boathouse and that telephone pole past it? If you come into the cove lining up the left hand corner of the boathouse with that pole, you'll pass right over a sunken tree or something that sticks 8 to 10 feet up off the bottom."

As the red light indicating the bottom slowly moved towards the 35-foot mark, Hugh kept constantly shifting his attention from the screen to the shore and back again.

"Must have missed it that time," Hugh said, as he shifted into reverse and began backing the boat up. "See that dock and pine tree? If you get past a point where the end of the dock and the tree line up and you haven't located the tree, you've gone too far."

"How do you remember all the places you've found on the lake?" I asked, as I watched him go through the tree-finding procedures he's duplicated thousands of times in his years of fishing Lake Norman.

"For the first few years I marked the spots on a lake map, but as I've gotten more familiar with the lake, I can remember the spots in my head," he said.

In late winter and early spring, schools of crappies move into piles of brush and other cover along shorelines, and that's where the successful angler will fish for them using small, live minnows or tiny artificial lures.

After backing up about 100 feet we idled forward again. Suddenly the red light marking the 35-foot depth was joined by extra flashes of red that extended to nearly the 25-foot mark on the screen.

"There it is," Hugh said as he grabbed a marker buoy with a weight and string attached and quickly tossed it into the water next to the boat. The buoy spun wildly in the water as the sinking weight found its way to the bottom, quickly unwinding the string. Cutting off the outboard and the depth finder, Hugh moved to the front pedestal seat, lowered the electric trolling motor into the water, and grabbed an ultra-light spinning outfit that was rigged with only a small hook and a split shot. "Dip me out a minnow," he said as he turned his attention to maneuvering the boat closer to the buoy.

"This place may be a little deep, but I've always had success here in the early spring," Hugh said as he hooked on a shiner minnow and lowered it into the water, carefully counting each reverse turn of the spinning reel handle. "We want to fish about 23- or 24-feet deep, just above the tree. This reel and the one you're using lets off a foot and a half of line with each turn so about 16 turns should be about right. If that doesn't produce we'll go a little deeper."

Sixteen turns was just right because no sooner had the shiner been lowered to the proper depth than the delicate rod's tip

bowed towards the surface indicating a strike. Sixteen turns forward and a crappie bigger than my hand was in the live well. The minnow was still lively and ready to be sent down for another try. Again the rod bowed and just as quickly as the first, another crappie was on board.

"Dip me out another minnow," Hugh said as he placed the fish in the well.

"Get your own minnow!" I quickly replied as I counted the turns on my reel, lowering my bait. I happily watched my rod tip make the tell-tale dip towards the water's surface.

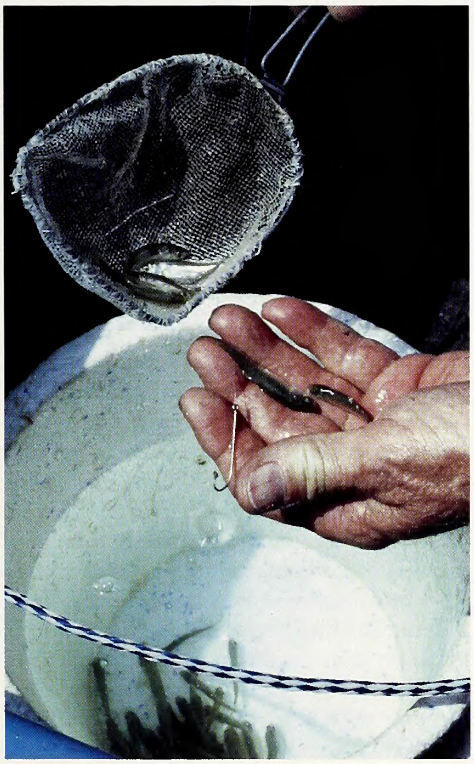
The cold was quickly forgotten and by the time we called it a day the wind had died down, and the clouds had moved on allowing the temperature to rise. We had found fish at several locations and at various depths from 5 to 25 feet. As the sensitive ultra-light rods began to bounce, signaling strikes, I forgot about my runny nose, teary eyes, and cold feet. When the minnows were gone we had several dozen crappies in the live well, and had thrown back several dozen more plus several small bass that were attracted to the brush.

This type of success is not uncommon for early spring crappie fishing and is one of the main reasons that crappies are the second most popular game fish sought by North Carolina anglers. This fact was proven by the most recent angler opinion survey conducted by the Wildlife Resources Commission. Crappies are popular because they are school fish and can be caught in large numbers from a single place. Crappies also taste good, and reach respectable sizes. Fishermen often talk of catching dozens or hundreds.

The popularity of crappie fishing has spawned crappie tournaments which are beginning to be held as alternatives to the large number of largemouth bass tournaments. The involvement of children is encouraged so that future fishermen can be introduced to the sport. Children are rarely involved in most bass tournaments because these tournaments are highly competitive and offer money and prizes. Crappie tournaments, on the other hand, aren't nearly as competitive and offer excellent opportunities for older fishermen to teach youngsters the basics as well as tricks they've learned through the years. Also because crappies reproduce so rapidly, it's all but impossible to overfish a crappie population.

North Carolina's numerous reservoirs are the places to catch crappies. From the Mountains through the Piedmont these reservoirs were well-built for hydroelectric power, municipal water supplies, and flood control. Fishermen claim that populations

Though crappies in the 3 and 4-pound class are occasionally caught, a 2-pounder is a very good one. Most tip the scales at less than a pound, yet because they are both plentiful and tasty, only the largemouth bass is more popular among North Carolina fishermen. The best bait is unquestionably a small minnow.



in most reservoirs change from year to year, particularly in the number of bragging-size fish. This seems to shift fishing pressure from lake to lake over the years. For example, the spring of 1983 saw tremendous catches of crappies from the recently impounded B. Everett Jordan Lake west of Raleigh.

Although crappies exist in streams they don't thrive there because they prefer open water. They also don't do well in farm ponds because they reproduce in such numbers that they can quickly overpopulate a pond and become stunted.

According to Cape Carnes, Piedmont regional supervising fisheries biologist for the Wildlife Resources Commission, "Crappie can be caught year round if you know where to look for them. But the biggest interest in crappie fishing comes in the late winter and early spring when the fish move closer to shore to spawn. This makes them more accessible to bank fishermen and consequently brings more fishermen out to try their luck. Crappies again move into the shallows as temperatures cool in the fall, but the fishing pressure isn't as great as in the spring because of hunting seasons, holidays, and other distractions."

Finding good producing crappie spots — "honey holes," as they're sometimes called — in the early spring is often a matter of trial and error. Bank fishermen should look for partially submerged brush or trees that have fallen in the water from the shore. Crappies frequent these spots as they

Condos For Crappies

Most fishermen know what attracts fish in large reservoirs. They expect to catch crappies and other fish around sunken trees and brush or trees that were cut on the bank and allowed to fall in the water. They also know that piles of sunken tires produce fish. Indeed, many fishermen sink tires and brush or cut trees to create good fishing spots. What most of them don't know is that the reservoir officials aren't pleased with the unregulated ways in which most of these "fish hides" are constructed and/or sunk.

Duke Power, Carolina Power & Light, Alcoa, and The Corps of Engineers, want more input into what's placed in their waters. The same is true of municipal waters. Indiscriminately placed objects can clog intakes or increase insect problems. Worse, they create navigation hazards if they float loose or become exposed during low water levels.

Because of this, the North Carolina Wildlife Resources Commission is working with several reservoir operators in North Carolina to place well-planned and constructed fish hides in heavily fished waters to improve fish habitat. Several fishing clubs have also donated time, money, and materials to assist in the placement of the fish attractors.

These fish hides are constructed of bundles of discarded tires that have been bound together. Each tire has a hole drilled in it so that air can escape allowing the bundle to sink. The tire bundles are sunk in areas away from heavy boat traffic, and are marked with a "Fishing Reef" buoy.

Some municipal lake operators still cut shoreline trees that fall into the water as attractors. However, they don't completely cut the tree from the stump, or they cable the felled tree to the stump of another tree. Either procedure keeps the tree from floating loose and causing problems.

Reservoir officials urge that you not try to create your own "honey holes" in reservoirs since the placement of tires, brush, and trees can cause problems.

The North Carolina Wildlife Resources Commission and some private groups have placed fish "hides" made of old tires and other materials in some lakes to attract crappies and other species; however, anglers should obtain permission before placing such structure in public lakes.

prepare to spawn. Fishermen using boats can have good success fishing near the shore at fallen trees that are visible or around known brush piles, but many of them use depth finders to locate underwater brush and tree laps some distance from shore. All of these obstacles provide cover for small forage fish which in turn attract larger predator fish such as crappies and largemouth bass.

When a promising spot is found, it's temporarily marked with a small float. If the fishing there is successful, the spot can be marked on a lake map. Then it can be found on later trips using both the map and coordinates of prominent on-shore objects such as trees, houses, power poles or docks. Crappie fishermen are very secretive about their best spots and never mark them permanently because other fishermen will find them. The wise fisherman will also have many such places on a large lake so that his chances of finding fish will be increased. He will also locate spots at various depths — as deep as 40 feet — so that fishing can be done at all times of the year as water temperatures warm and cool. This also helps provide fish-producing spots on lakes where water levels fluctuate adversely during the year.

Some fishermen anchor over or near a spot, but if conditions aren't exceptionally windy, working the area with an electric trolling motor is an excellent way of covering the entire area without much disturbance. Quite often the fish can be caught in only a very small spot, so give the area a thorough going over before moving on to another spot.

How deep you should fish can be determined by locating the highest point on the submerged obstacle with the depth finder and fishing at a depth just above it. By measuring the length of line let out with each turn of your reel handle, you can get the bait to the proper depth.

If a depth finder isn't available a known underwater obstacle — spotted possibly during low water — can be fished by trial and error until the proper depth is determined by a combination of boated fish and snag-ups. For obstacles in shallow water, the best plan may be to anchor some distance away and cast to the spot using bait or lures suspended below floats.

The type of bait used and the manner in which it's presented is a matter of choice, but since the crappie's favorite food is small shad, it makes sense to use them. Small shiner minnows take more crappies year in and year out than any other bait. For minnow fishing, some #6 or #8 long-shank hooks, some split shot, and a few adjustable floats are all that's necessary.

Rigging up to fish for crappies with minnows is simple. Tie on a hook, press on a split shot 12 to 18 inches above the hook, bait up with a minnow hooked in the lips, lower this rig into the water to just above the bush or tree at your chosen spot and get set. If you're fishing deep, and have a trolling motor, work the area completely. If a float is necessary because the water is shallow or you're fishing from the bank, clip one on at a place on the line that will keep the minnow at the proper depth.

Jigs — usually white ones — work very well, as do small spoons, such as Lil' Cleo. Various other bladed spinning lures, such as Beetlespins, Shysters, and Rooster Tails, will also catch crappies. Basically, lures that work well at other times of the year are good for crappies during late winter and early spring because the fish feed on live minnows and small shad the year round. Jigs have proved to be particularly effective when fished in brush near shore or jigged over submerged brush while suspended 2 to 4 feet below a torpedo float. These artificials may be considered more sporting by some, especially when used with ultra-light tackle, but for putting fish in the cooler, it's hard to beat a live minnow.

For the real purist, a wet fly resembling a minnow can be fished with a light fly rod when the crappies are in shallow water in the early spring.

Tackle for crappies can range from cane poles to regular spinning gear, but to get the most enjoyment out of each fish caught, ultra-light spinning tackle is best. Two-to-4 pound test line is recommended especially when casting small, light lures.

A few words of caution may be in order. Fishing from a boat during the late winter and early spring can be dangerous because of cold water temperatures and unpredictable weather. Wear a P.F.D. at all times, particularly if the water gets choppy. Type III P.F.D.'s in the form of vests are quite comfortable and do not hinder movement. In addition to offering protection in case of an accident they also serve to break the wind. Entire jackets filled with foam flotation material called float-coats are also quite warm and offer exceptional protection from hypothermia if you happen to end up in the water.

If you fish alone, install a safety kill switch on your boat and attach the activation plug to your belt with a string. Then if you happen to fall overboard the engine will stop. This simple, inexpensive device can prevent injury from the propeller, and will also enable you to get back to the boat and get out of the water.

Success with early-season crappie requires some planning, some caution, some warm clothing, and some luck. But for those of you who, like myself, get downright stir crazy after the final hunting seasons close, crappies can bring late winter action so fast that you'll quickly forget the cold. And the reward of catching a live well full of tasty, fresh crappies is worth the effort. ⊠

A Voice For Wildlife

For over 38 years, the Wildlife Federation has been the most effective private wildlife group in North Carolina.

by Mark Taylor

photography by Wildlife Resources Commission

The bobwhite quail has been the symbol of wildlife clubs across North Carolina since they banded together nearly four decades ago to promote sound wildlife management.

At best, the experience could only be described as downright frustrating. The date was February 6, 1945, and about 150 prominent hunters and fishermen from across North Carolina had traveled to Raleigh to speak at a public hearing before the General Assembly. The sportsmen were seeking an independent state agency to scientifically manage fish and wildlife resources in North Carolina, and to improve hunting and fishing in the State. The men were optimistic about the chances of their proposals. When only 12 of them were allowed to speak because of a lack of time, however, they bitterly concluded that they had been given the run around.

Fighting mad, they met a few hours later at the nearby Sir Walter Raleigh Hotel and chartered the North Carolina Wildlife Federation — an organization dedicated to obtaining an independent wildlife agency for the State, and to the promotion of wildlife conservation. Their immediate goal became a reality in 1947 when the General Assembly created the N.C. Wildlife Resources Commission — the state agency charged with the management and protection of fish and wildlife resources in North Carolina.

"The goals of the North Carolina Wildlife Federation haven't changed much since the organization was formed 39 years ago this month," said Mike Mann, former executive vice-president of the Federation. Mann recently resigned his position, and as of this writing his successor has not been chosen. "Our top priority is still to maintain a sound, well-financed Wildlife Resources Commission in the State. Without a healthy state wildlife agency, sportsmen and wildlife will both suffer. Since 1947, when the Federation helped establish the Wildlife Commission, there has been almost a family relationship between the two organizations."

The North Carolina Wildlife Federation is a private, non-profit organization that has about 30,000 members in North Carolina. About 75 percent of the members are sportsmen, and many belong to local wildlife clubs which are affiliated with the statewide organization. In turn, the North Carolina Wildlife Federation is an affiliate of a much larger organization — the National Wildlife Federation. With over 4,300,000 members, the National Wildlife Federation is the nation's largest conservation organization, and one of the most influential. Ties between the two organizations are close. In fact, the current executive vice-president of the National Wildlife Federation is Dr. Jay Hair, who was previously a professor of zoology at N.C. State University. Dr. Hair was highly active in the N.C. Wildlife Federation, and continues to maintain close ties with the Tar Heel State.

"Both the state affiliates and the National Wildlife Federation benefit from this arrangement," said Mann. "For example, sportsmen in North Carolina are represented on the national level by a large organization with considerable legislative clout in the Congress and Senate. In return, statewide affiliates provide the National Wildlife Federation with a strong network of grassroots support. State affiliates send no money to the National Wildlife Federation; however, the local affiliates do obtain help from the national organization with fund raising, educational materials, and lobbying for state interests on the national level."

One of the primary activities of the North Carolina Wildlife Federation is to provide a voice for wildlife and sportsmen in North Carolina's General Assembly. In fact, there are only three professional environmental lobbyists in the State, and two of them work for the Federation. The third represents the Sierra Club and Conservation Council of North Carolina, but also serves on the board of directors of the N.C. Wildlife Federation.

"We've had considerable success in our lobbying efforts in the past several years," said Mann. "The Federation was instrumental in helping to obtain passage of the nongame tax checkoff, State duck stamp, and revision of the license fees. All of these bills offered additional sources of funding to the N.C. Wildlife Resources Commission, and we will continue to work in this area in the future.

"However, our lobbying efforts are not confined to bills dealing with the Wildlife Commission," said Mann., "If we are to continue to enjoy the sports of hunting and fishing in North Carolina and wildlife in general, a clean environment is a must. Consequently, we actively lobby for many environmental bills. One of our biggest fights last year was to help maintain the Coastal Area Management Act, which protects the environmental quality of our coastal lands and waters. Fortunately, we were successful. On the national level, the North Carolina Wildlife Federation also led the lobbying effort by 13 southeastern states to obtain passage of the Barrier Islands Act. This legislation was adopted,

The North Carolina Wildlife Federation has maintained a close working relationship with the National Wildlife Federation, and in 1983, Governor James B. Hunt Jr. presented Jay Hair with the Governor's Conservation Award (upper left) for his work as executive vice president of the national organization and his ties to this State. The State organization also sponsors the popular annual Dixie Deer Classic (upper and lower right). Local clubs sometimes sponsor fishing contests to promote youth fishing, and this string of catfish took honors in a Lincoln Sportsman Club's function (lower left). Shown are catfish division winner, Chris Lineberger (left) and Federation representative Johnny Davis.

and protects undeveloped barrier islands from development. Through the legislature, we've also opposed massive land-clearing operations and peat mining on the North Carolina coast. These operations threaten water quality in our sounds, which hurts commercial fishing, sport fishing, and water-based recreation. Valuable habitat for wildlife and waterfowl is also being lost to these activities."

Mann adds that the Federation will focus on two key legislative issues in the future, which include protection of water quality and the need for comprehensive, regional land-use planning throughout the State. "These issues go hand in hand. For example, water quality problems on the coast are tied to large land-clearing operations and agricultural runoff. Sound land-use planning on a regional basis could prevent some of these water quality problems, and could also ensure that adequate habitat is left for wildlife. North Carolina is rapidly changing from a rural to an urban state, and if we're going to continue to enjoy hunting, fishing, wildlife and outdoor recreation in the next century we need to take some steps now to protect wildlife and the environment."

In addition to lobbying, the Federation has active wildlife and education programs. The bald eagle restoration project at the Lake Mattamuskeet National Wildlife Refuge, for example, was partially funded in its first year by a grant from the N.C. Wildlife Federation. Currently, the Wildlife Federation and the Weyerhauser Corporation are sponsoring a study of ospreys at Lake Ellis in Craven County.

"The osprey colony at Lake Ellis is one of the largest on the East Coast," said Mann. "For some reason, this colony thrived in the past while other osprey populations were nearly destroyed by the use of DDT and similar pesticides. We're trying to determine why these birds weren't hurt by pesticides. How the colony functions is also being examined. Biologists are seeking to find if the birds group together for protection, mutual feeding, or other reasons. There are about 90 ospreys in this colony, which includes about 40 nesting pairs."

Educational programs are also a priority. One of the latest cooperative projects of the Federation was to co-sponsor a "Fur-Fish-N'Game Rendezvous" with the Wildlife Commission, 4-H program, and the N.C. Extension Service.

"The Fur-Fish-N'Game Rendezvous was held at Camp Millstone near Ellerbe last summer," said Mann. "The program was open to kids from ages 13 through 19, and emphasized the traditional skills of hunting, fishing and trapping. Students also learned the role that these sports play

Each February, the Wildlife Federation hosts its annual Governor's Award Banquet to honor outstanding efforts in wildlife and environmental conservation. Among the many winners at the 1983 banquet was Robert Harris of Mt. Gilead, the 4-H demonstration winner (above). At the Fifth Annual Hunter Safety Shooting Tournament sponsored by the Wildlife Commission (left), the Federation presented a lifetime sportsman license to Carl Michael Parrish of Randleman. Federation Director, John Hopkins, shakes hands with Parrish while Mark Suggs looks on.

in wildlife-management programs. The program placed a heavy emphasis on outdoor ethics, and also offered students an opportunity to explore career opportunities in wildlife and fisheries management. The camp was very popular, and we plan to help sponsor the same program next year. In the future, we'd like to set up four or five of these throughout the State and serve 500 or more students annually."

In addition, the Wildlife Federation serves on the North Carolina Council on Environmental Education, which is developing an environmental-education program for schools. The main project of this council has been the development of the *Carolina Notebook*, an environmental-education aid that is mailed free to over 4,500 teachers throughout the State. The Wildlife Federation also maintains a free film library, provides speakers to many organizations, and offers five to 10 scholarships annually to students majoring in wildlife or marine biology.

Perhaps the most publicized of the Federation's programs are the Governor's Conservation awards. This program recognizes outstanding contributions by individuals or organizations to soil, water, air, forest, mineral-resource and wildlife conservation. In addition, the program honors a conservationist of the year, sportsman of the year, conservation educator of the year, youth conservationist of the year, organizations of the year, legislator of the year, and marine fisheries and wildlife enforcement officers of the year. Outstanding contributions to hunter-safety education, conservation communication, and industrial and municipal conservation efforts are also honored by the program.

"The Governor's Conservation awards seek to promote better conservation by honoring individuals or organizations that have made outstanding contributions to conservation in North Carolina," said Mann. "Over the past 25 years, these awards have become very prestigious, and are presented by the Governor of North Carolina at the Federation's annual convention in late winter."

What does the future hold for the North Carolina Wildlife Federation? "We'd like to become a stronger voice for wildlife conservation in the State. For example, there are probably a half-million sportsmen in North Carolina, yet very few belong to the Wildlife Federation or to other conservation and wildlife organizations. More of these sportsmen need to be involved in wildlife conservation. We'd like to build a broad-based coalition for wildlife conservation and a clean environment based on sportsmen and wildlife organizations like Trout Unlimited, N.C. Wild Turkey Federation, BASS and others. We'd also like to include conservation organizations like the Audubon Society, Nature Conservancy, Sierra Club and Conservation Council of North Carolina.

"Many of these groups have made strides in restoring and protecting habitat for a single species, and we work closely with all of these groups in our programs. However, we would like to make the Wildlife Federation the 'umbrella' organization that speaks for all outdoor and conservation interests. This has been done in some other states, notably Missouri, which has the best state conservation program in the nation. If sportsmen, wildlife organizations, and environmental groups could unite through one organization — while maintaining their autonomy — and speak with a single voice, we could build a great future for wildlife in North Carolina."

If you'd like to become more active in wildlife conservation, a good way to start is by attending the North Carolina Wildlife Federation's annual convention. This year, the event will be held from March 2-4 at the Mid-Pines Resort in Pinehurst.

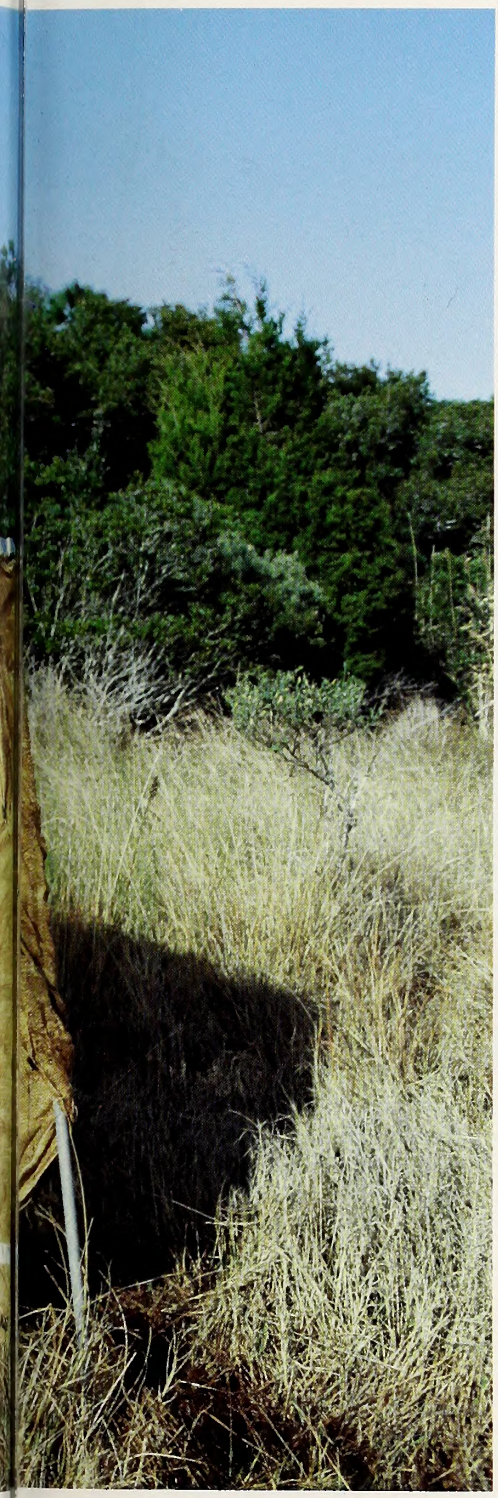
"The Federation includes speakers and seminars on a wide variety of conservation issues," said Mann. "This year, the program will feature presentations on acid rain, a Governor's candidate forum, and others. The public is welcome to attend and participate in these programs."

For more information, contact the N.C. Wildlife Federation, P.O. Box 10625, Raleigh, N.C. 27605.

Building A Photographic Blind

written and photographed by Randy Lennon

Many of the best wildlife photographs are taken from a carefully constructed hiding place.



Lightweight photographic blind (left) has a frame made of electrical conduit with a prestitched skin of burlap pulled over it. A blind such as this can be moved easily to bring the photographer where the subject is. A close-up of a nesting royal tern (above) becomes routine with a blind.

As the last freezing winds of winter die away, the wildlife photographer's spirit rises proportionately to the increasing level of mercury in the thermometer. This is a photographic principle no less valid than the Theory of Light or the Density-Contrast Curve.

For the serious photographer, enduring the winter months can be as depressing as dropping the trusty Nikon into Junior's backyard wading pool. But as the fair winds of spring begin to stir, camera bags are dusted off and the frantic search for lens paper and camel hair brush is on. At last! You finally get to try that new telephoto lens Santa brought on something other than old sourpuss Felix, the uncooperative family feline. You're bound to get a dozen magazine cover photos with that baby.

Well, whether you're shooting for pure enjoyment or for that cover shot, there is one way to improve your ratio of "keeper" photographs while increasing your knowledge and enjoyment of our wonderful North Carolina wildlife. By building and correctly using a photographic blind, you can become privy to many interesting facets of wildlife behavior and add professional quality shots to your slide shows.

The principle behind using the blind is concentration of close-up photographic efforts on subjects in one particular location. As it is undoubtedly awkward to wander around forest or marsh inside a blind, the devoted stalker considers the lack of mobility a distinct disadvantage. "Hip-shooting" or stalking your photographic prey is a technique that has contributed many of the stunning photographs we enjoy in nature magazines today. However, this chance encounter technique too often results in tail feather shots of herons, or anatomical studies of the locomotion end of the marsh rabbit as he exits, leaving a frustrated photographer behind. In the blind, the photographer receives compensation for the restriction of mobility by having the opportunity to use fill flash as well as shorter focal length lenses thereby increasing depth of field and image sharpness.

By nature, photography from a blind is a game of sit and wait. Be prepared to spend a considerable amount of time in the blind watching your subject. This time spent

Hidden from view, you can observe animal behavior that is normally unseen. The unthreatened oystercatcher (above) shades her eggs from the sun while regulating her own body temperature by panting. One chief benefit of a photographic blind is that the photographer can use shorter focal-length lenses, thus increasing depth of field and image sharpness.

observing and sharing the intimacies such as those between parent and young at the nest is the real attraction to adopting the blind technique.

Practically anything that conceals the photographer can serve as a blind. The complete outdoorsman may already have one in the form of his small camping tent. A slit in the side to accomodate the lens is all that is needed for a make-shift, but serviceable blind. The serious nature photographer who anticipates using a blind frequently should consider building a custom model.

Construction design and choice of materials should emphasize portability and comfort. Unless it is light and easy to carry it will limit your range and endurance in the field. A good deal of your success will depend upon sitting quietly for long periods of time in relative comfort. Constant shifting of your body to relieve cramped limbs will alert wary animals of your presence.

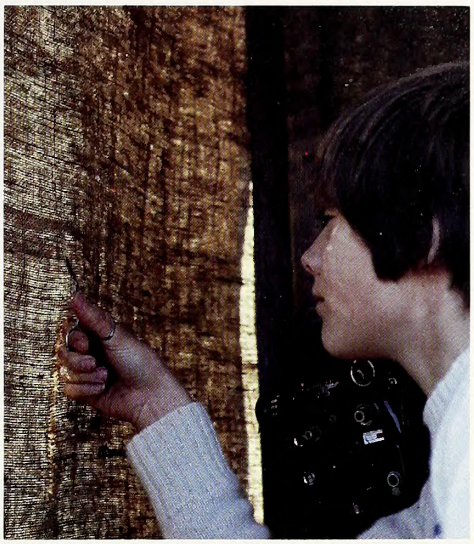
The camera, lens, and tripod system that you intend to use will influence even simple design features. The correct placement of such features as view ports, lens openings, and tripod leg slits, if needed, can enhance your comfort and results. Do not wait until mother is trying to brood young in the nest to do rehabilitation work on an ill-conceived design. Think it out before hand. Decide what you intend to put inside the blind with you and how large it will have to be to provide necessary comfort. Set it up in your den and try it out with your equipment before going into the field. One or two more photos of old Felix can't hurt.

Many types of construction material are available. Burlap makes a relatively inexpensive outer covering for the blind. The loose weave of the burlap allows adequate ventilation during hot summer days. However, if the weave is too loose, the photographer's outline will be visible from the outside, destroying the advantage of concealment. This can be eliminated by using two layers of burlap, or by camouflaging the outside of the burlap with dark spray paint to break up shadows from the inside. In a pinch, vegetation can be placed against the front of the blind to help conceal shadows.

The light nylon used in military parachutes has been used with success and doesn't create the problem of fiber shedding sometimes encountered with burlap. Ideally, the camouflaged material should be used. It is important to blend the blind into the natural surroundings as much as possible. This will cause less disturbance to the animals you are

Sturdy two-by-twos are a good frame material for a permanent blind. Cut the wood into 3- and 4-foot lengths, and then nail the lengths together to make rectangles. Stretch burlap over each rectangle and fasten with staples.

Assemble the frame with 4-inch bolts placed into pre-drilled holes. Make sure all loose ends of burlap are secured so they won't flap in the wind and scare subjects. A burlap roof stapled over the sides completes the blind.



With the blind in position, cut the openings for your camera lens. Set up your camera as it will be used to determine the correct height for the slits. Blind is now ready for use.

photographing and more importantly, it will make the blind less conspicuous to the curious humans who can't seem to resist the temptation to investigate.

Structural members of the blind may be of wood or metal. Two by two inch lumber nailed together into rectangles approximately 4 feet by 3 feet in size and covered with tightly stretched burlap provide the sides for a sturdy blind that will endure an entire season's exposure to sun and rain. A heavy-duty staple gun is ideal for attaching the material. Special care should be taken to secure all loose edges as material left flapping in the breeze will scare away wary subjects. Small panels of one-way plastic, such as the commercially available Solar Screen, can be stitched into the burlap to allow a view of the outside world.

If you must move the blind daily, a collapsible type can be made by using three-quarter inch diameter electrical conduit. This, when bolted together makes a light, yet sturdy frame. Set firmly into the ground and covered with a pre-stitched skin of burlap or nylon, it is durable and easily carried to and from the site.

The most logical location for a blind is an area where the subject is guaranteed to make frequent visits, such as a feeding station or nesting site. Feeding stations can be set up practically anywhere. Photography of nesting birds can be rewarding but requires a great deal more caution than working a feeding station. As an intruder into the private world of animals, the photographer has a responsibility not to endanger the subject he seeks. The photograph is not worth the loss of one nestling. With a little knowledge of the particular species and a cautious approach, babies can grow up and your slide file can grow as well. But the blind must be introduced carefully.

Ideally, the blind should be set up in a known area of activity thereby establishing it as part of the landscape before the nesters arrive. After nature takes its course and mother and father set about raising their family, it is simply a matter of selecting a nest to photograph and slowly moving the blind closer over a period of several days. As you move the blind a few feet closer each time, observe the nesters reaction to the move. If they hesitate in returning to the nest, move it back and start the process over again. Be patient. If you try to force the issue, you run the risk of their abandoning the nest. Entire colonies of nesters have been known to do this when predators invaded the area. To a mother bird, at the onset, you are no less intolerable than a hungry raccoon.

If you must photograph a nest where incubation is already underway, you will have more success and run less risk of damage to the birds if you make your approach just prior to hatching. The longer the adult sits on the eggs, the stronger her attachment to the nest becomes. She is therefore less likely to abandon it late in the cycle. Though chance of abandonment is reduced, you must continue to safeguard against keeping her off the eggs for any length of time. Prolonged exposure to the sun will overheat the eggs, killing the embryos inside. So, if she is hesitant to resume incubation, move back quickly and try a more cautious approach.

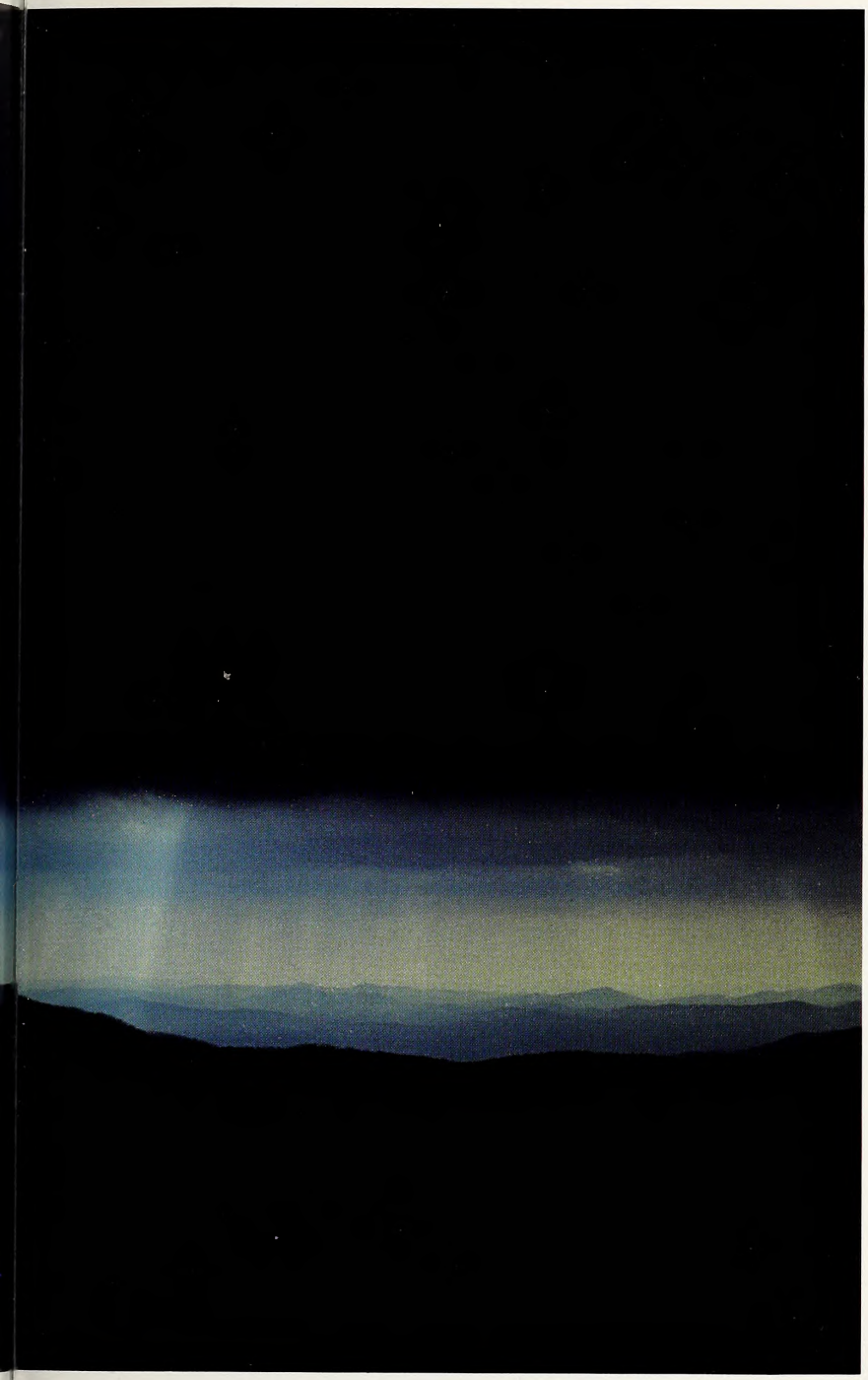
If hatching has already occurred, resist the temptation to try to photograph the young during the first day or two of life. In some species, the young are unable to regulate body temperature when first hatched. The adult performs this function for them by sitting on them or shading them with its body. In a few days the chicks will have such voracious appetites that mom and dad will be working overtime stuffing their constantly gaping mouths. This will provide ample opportunity for you to finally snap that cover shot.

As nature photographers we are privileged visitors into the world of wildlife. But with the privilege comes the responsibility of ensuring that our intrusions are not at the expense of the creatures we hold in such fascination. With a little care and common sense we can enjoy a pleasurable and challenging pasttime, finding comfort in knowing that we left our North Carolina wildlife undisturbed for others to enjoy. ⊠

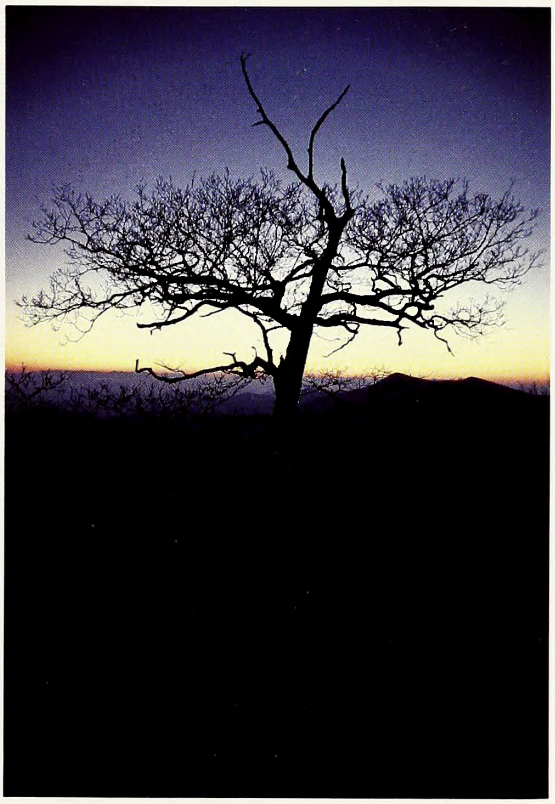
Armed With A Camera

A photographic portfolio by Ken Taylor

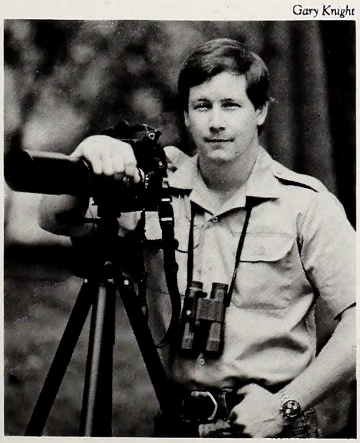
A career as a wildlife photographer can be exciting, but it's also hard work.



"I was driving along the Blue Ridge Parkway in Avery County when I saw the light breaking through the dark clouds (left). I used a 75-200mm zoom lens on a tripod to take the picture. I think the shutter speed was 1/4 of a second. The sun had already gone down when I saw the tree (below) silhouetted against the glow. I guess I liked the design of the tree. I used a 19mm lens, and shot from beneath the tree to position the horizon line where I wanted it."



Gary Knight



Wildlife photography is a career like any other — just your normal 10 hour day freezing in a blind on Lake Mattamuskeet, or swatting flies on an August afternoon in a cypress swamp, or trudging up steep mountain paths with 50 pounds of gear on your back.

Oh, you didn't know about that? Let photographer Ken Taylor tell you about that part of his job, about the three days it once took to get a turkey photograph, about the time his remote-controlled cameras were drenched in a sudden rainstorm. Ken will tell you that getting paid to take pictures for *Wildlife In North Carolina* and other Wildlife Commission projects is the best job in the State, but there's little glamour in it.

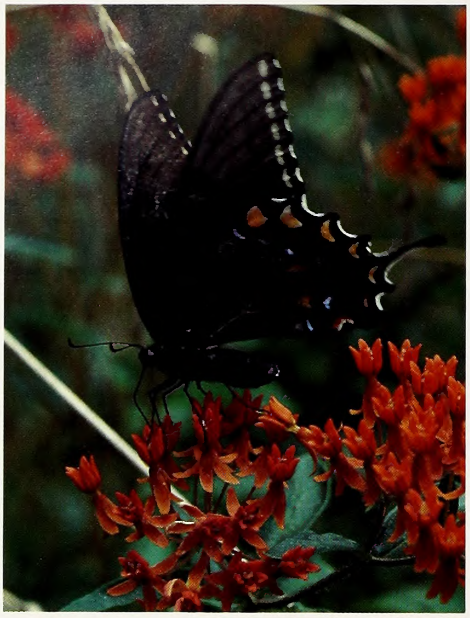
"Too many people think that wildlife photography is running out and taking pretty pictures. Sorry, it's not that way at all. It's work — hard work," he says.

"The logs framed the trillium perfectly when I saw this scene while hiking around Crabtree Forest. I used a 60mm macro for this shot (facing page). I liked the new colors of the dandelion — the bright yellow and dark greens — and took this picture (above, left) in my mother-in-law's lawn in Columbus County. To get the butterfly (above, right) I lay on my belly with the camera and a 100mm macro on a small, table-top tripod. I used a fill flash because the sunlight was coming from behind the insect and I wanted some detail in its wings. I photographed the fawn (left) in the Wildlife Resources Commission holding pen in Caswell County."

Since 1977, when he joined the Wildlife Commission as chief photographer, Ken's images of nature have delighted readers of this magazine, and frequently prompted mail inquiring about his photographic techniques. Accompanying this portfolio of some of his recent photographs are captions explaining how he went about getting the picture. And for those photographers seeking to improve their nature photography, Ken offers several tips.

"The best advice I'd offer is to know what you want before you step out of the door," he says. "You've got to be able to control the situation, so you've got to know what it is you're looking for and what equipment and techniques you'll need to do the job."

Planning, in other words. Although a great nature photograph may occur in a fraction of a second, it is rarely a spontaneous event. "You've got to

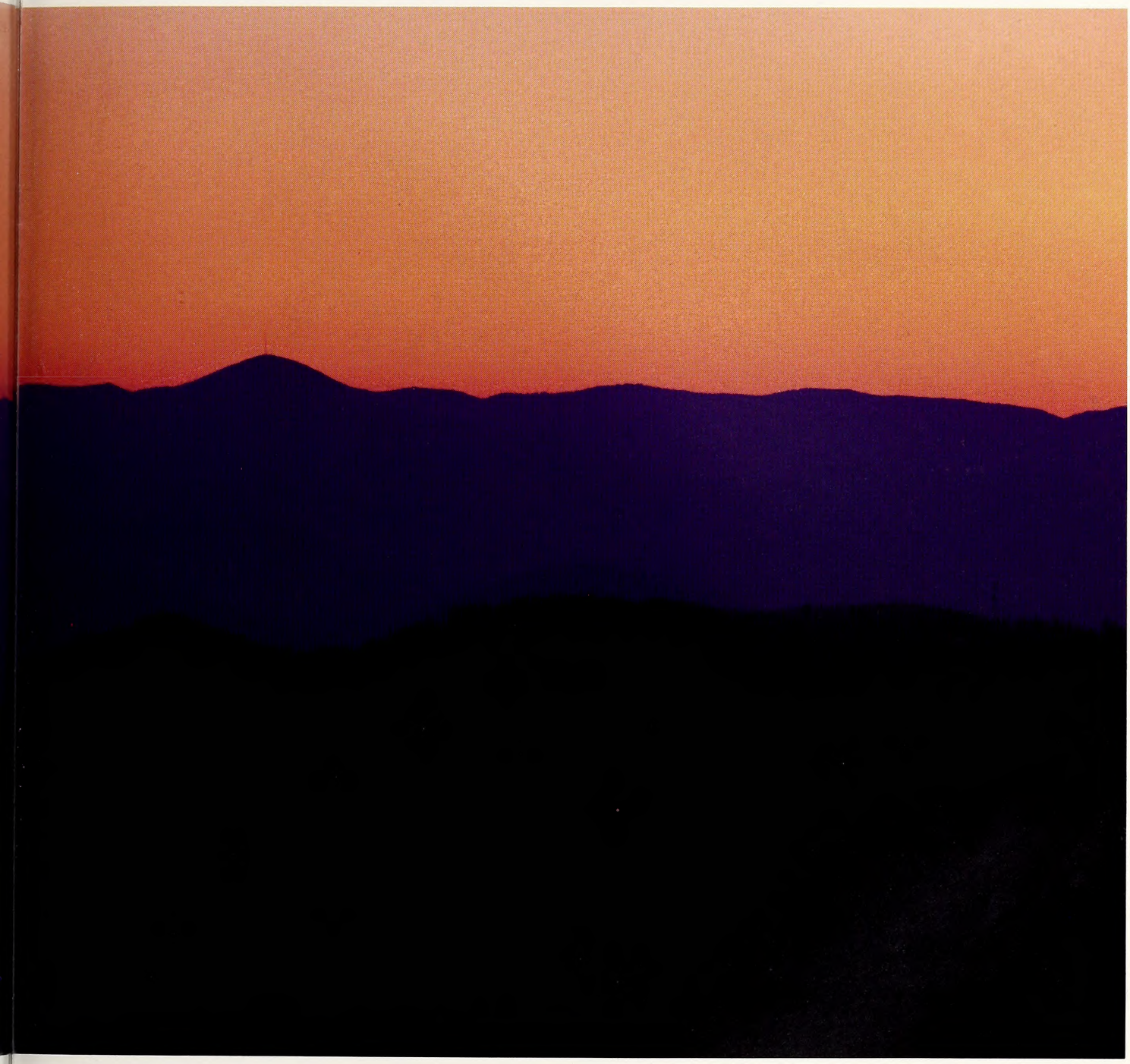


"You don't have to stop shooting after the sun sets, in spite of what a lot of people tell you. Sometimes your most dramatic shots come in the nice light after sunset. I was driving along the Blue Ridge Parkway looking into Buncombe County just after the sun had set when I saw the pretty light (right). I composed the picture through a 180mm lens. Another time I was in Roanoke Sound (below, left) at the end of the day. The hunters and dog were in one boat, and I was driving another. I matched my boat's speed to theirs, held up my Nikonos with 35mm lens and got the picture. It was a very slow shutter speed, too. I used a Hasselblad, a close-up lens, and a ring-light to get the picture of the butterfly on the flower (left)."

know the habits of wildlife. Learn to think like a wildlife biologist, know where the animal will be at certain times of the day or the year. I hunt a lot and I've noticed that the elements that go into a successful hunt are the same ones that make for successful wildlife photography — scouting, wearing the right camouflage, tracking."

Ken uses blinds for much of his photography, especially for photographing waterfowl. And he has a couple of tips for using blinds correctly. "I'm going down to Lake Mattamuskeet this week, and so I'm putting together the necessary equipment for blinds. I've scouted there before so I know where to put the blind in relation to the rise and fall of the sun. That's important so that you don't get the sun shining into your camera lens instead of on the subject.

"I also would rather use natural materials from that area for the blind



rather than artificial materials. They blend in better and there's less chance of spooking your subject. It's just like hunting. The clothes I wear change depending on the season of the year. In warm seasons I wear more green; in fall and winter I wear brown."

The more elements that you can control, the more chance you'll bring home that great nature photograph. That's where planning comes in. But Ken also says that photographers ought to be ready to catch the spontaneous events that could never be planned.

"The main thing is to be there and be prepared," says Ken. "The more time you spend outdoors, the better chances you have of getting those spontaneous things that you could never plan for. I've gotten many of my best scenics, for example, when the light changed suddenly and I clicked off a few frames before the effect disappeared."

"It took three days of calling to get the turkeys in the right light at the right time for 30 seconds of picture taking. I was camouflaged from head to toe, complete with face paint, lying in a foxhole on the Marine base at Camp Lejeune. I used a 400mm lens at 25 yards. I photographed the copperhead (above) in Pilot Mountain State Park in Surry County. I lay on the ground with the camera and a 100mm macro lens mounted on a table-top tripod."

Good equipment is important for any photographer, but for wildlife photography certain equipment is essential. A good 35mm single-lens reflex camera, with a through-the-lens light meter, is the most useful kind of camera for wildlife. It's light and can be fitted with many lenses. Some photographers prefer to buy a micro lens with the camera, rather than the 50mm normal lens. Nature subjects come in small, almost microscopic packages as well as in large ones and the smart photographer is prepared to explore these tiny mysteries, too.

"The second piece of equipment I'd buy is a sturdy tripod," Ken says. "It's a burden sometimes, but it's worth every ounce of sweat in low-light situations."

Telephoto lenses help the photographer fill the frame with an animal that might be spooked if the photographer were closer. Of the telephoto lenses, Ken most frequently uses a 180mm, a 400mm and a 560mm. But in the beginning the wildlife photographer might only need a short telephoto and concentrate on getting closer to his subject. "I use the 180mm lens quite a lot, even for landscapes. Most people think you need a wide angle for landscapes, but a 180mm lens or a zoom lens can isolate a portion of the subject that is simple and has impact."

The mechanics of a great photograph are simple: You expose a piece of film to a bit of light and presto! there's a picture that takes your breath away. It doesn't happen too often, which is one reason why Ken Taylor and others spend their long, lonely hours out in the woods. But Ken's got another secret behind his photography that other photographers can share: the locale.

"North Carolina is a perfect place for nature photography," he says. "It has so much diversity — mountains, oceans, rolling Piedmont, swamps. Western states may have imposing mountain vistas, but they don't have the ocean. For a wildlife or nature photographer, I can't think of a better place to shoot than North Carolina." — *by Lawrence S. Earley* ⊠

Treetop Rivals

The common, yet rarely seen, flying squirrel may be a threat to the endangered red-cockaded woodpecker.

by Lawrence S. Earley

On most days, and some nights, you can find Jay Carter roaming the Sandhills Game Land or the Fort Bragg Military Reservation with a specially built Swedish ladder under one arm and a stout stick in his free hand. He is looking for an old longleaf pine tree with a hole in it about 25 feet high. If he finds one he'll rap the pine with his stick and stand back.

Carter has been rapping on pine trees for 10 years or so, and especially since 1978, the year he joined a research project at N.C. State University on the endangered red-cockaded woodpecker, the architect of those 25-foot high cavities. More and more, however, what he's finding in these cavities are not red-cockadeds at all. They are furry little things that usually respond to his rapping by sticking their heads out of the hole and peering down at him. Or they'll keep mum, and when Carter climbs his ladder to investigate, they'll scramble to escape, occasionally launching themselves full tilt into his face.

They are flying squirrels. Flying squirrels in tree cavities are not unusual, even tree cavities made by red-cockaded woodpeckers. House-napping in nature is common. You don't have to ask permission to take over another creature's den — unless it's bigger than you are or shows a willingness to defend its territory. The natural world is a highly competitive one, for space as well as for food.

What makes flying squirrels in red-cockaded "houses" so special is that the red-cockaded is an endangered species and its populations continue to decline as its habitat in the eastern pine forests disappears. And the flying squirrel? This elfin creature of the night is all over the place and can nest just about anywhere. The competition seems to be a little unfair.

The case of the flying squirrel versus the red-cockaded woodpecker is a curious one and yet all too familiar. Familiar because once again it points out the effects of man's alteration of the habitat on creatures that might otherwise coexist. Curious because people who care about the plight of the red-cockaded are tempted to give mental raspberries to one of the most endearing of all mammals, the flying squirrel.

The southern flying squirrel *(Glaucomys volans)* is the tiniest of squirrels, weighing no more than 4 or 5 ounces, and equipped with a featherlike tail and very large eyes that shine reddish-orange in the light of a flashlight. It is abundant, even prolific, breeding twice during the year, once in the late winter and the second time in the summer or fall, usually delivering one to three wee young each time. Except for its belly, which is white, it is covered with a lustrous reddish-brown or gray coat which would make a furrier's eyes gleam if it were not so small. Although its favorite food is nuts, especially hickory nuts, it will eat just about anything — insects, pine seeds, acorns and even carrion. It is quite adaptable, denning in oak hollows, leaf nests or in woodpecker cavities, flourishing in all kinds of habitats.

As common as this nocturnal creature is, few people ever see one. Those who do are no doubt full of nocturnal habits themselves. Late night walkers, folks who don't mind tripping on patched sidewalks in order to keep their gaze high, ever watchful for a big brown bat, perhaps, or a screech owl or even the sudden swoop of something white through the oak branches, the sign of the flying squirrel.

For such a ghostly creature, the southern flying squirrel is found practically all over the State, in urban areas as well as in forests, in the Coastal Plain and at elevations up to 4,500 feet. If you've got gray squirrels in your trees, you've probably got flying squirrels, too. In the United States it ranges along the East Coast, north into southwestern Ontario and south into Mexico. Its kin, the larger northern flying squirrel *(Glaucomys sabrinus)*, roams throughout Canada, down into some of our northern states, and

Steve Maslowski

Only a foot long and weighing about 4 ounces, the flying squirrel is the tiniest of all squirrels. It seeks cavities in trees for its dens.

"Flying" may not be the exact word for what the flying squirrel does. It soars, it swoops, it sails. It glides through life by means of its outstretched cape . . . that connects all four legs and billows like a sail.

Leonard Lee Rue, III

Flying squirrel's outstretched membrane billows like a sail, enabling it to swoop from tree to tree. The membrane folds along the squirrel's sides when it is not in use.

along the Appalachian spine. It is found on three or four mountain peaks in North Carolina, although it is not common.

"Flying" may not be the exact word for what the flying squirrel does. It soars, it swoops, it sails. It glides through life by means of its outstretched cape, folds of skin that connect all four legs and billow like a sail when in flight. It uses its tail as a rudder, and can easily adjust the angle and speed of its glide, pulling itself into a vertical position to brake its momentum, and landing with a feather touch.

With the ability to make 90 degree turns in mid-air, flying squirrels are Immelmans of the squirrel world. On the ground they move equally as well, although, as writer Ted Williams recently described them, they look like "old men trying to walk with their trousers down around their ankles." Since they glide downward at a 30 degree angle or more when traveling, long trips involve a great deal of running up tree trunks to achieve the proper height. In his *Mammals of North America* (1947), Victor Cahalane described the efforts of flying squirrel mothers to move their babies from downed trees. "In a number of cases, the mother squirrel . . . climbed up the clothing of the human kidnappers and took the offspring, one by one, from their hands. Rolling each baby into a ball, she grasped it by the slack skin of the belly, climbed a nearby tree and glided to another where a cavity offered a new home. Successive trips were made until the whole family was in safety. Young squirrels up to almost half the mother's weight are sometimes carried up trees and through the air in this way."

If you could call a wild animal cute, you'd have a likely candidate for the term in a flying squirrel. And yet, and yet . . . their abundance in the Sandhills is causing some problems for the red-cockaded woodpeckers. They're competitors for scarce tree cavities. They may even be predators.

"We've had some cases where the only good cavity in a site was occupied by flying squirrels," Jay Carter says. "Some cavities seem as though they always have squirrels in them. The cavity may have fresh woodpecker chippings around it, but if you go there 10 times you'll find squirrels 10 times. Other observers have noticed that one night you have a squirrel; the next night you have a red-cockaded; and the next night the squirrels are back. There's little doubt that there is competition for nesting sites between red-cockadeds and flying squirrels."

On one occasion, Carter found a dead flying squirrel stuck to the pine resin around a cavity. Another time, Carter found a flying squirrel and a red-cockaded wedged so tightly together in the cavity that they were fused into the resinous walls. He hypothesizes that an incoming squirrel met an outgoing woodpecker and like Laurel and Hardy got stuck in the door.

The flying squirrel as predator is a harder case to prove. There hasn't been a "smoking gun" yet; the evidence has been more circumstantial. "We've had a number of nests where eggs have disappeared," he says. "We've found fragments of eggs or ejected eggs in and below the cavities. We have found flying squirrels in cavities with pieces of red-cockaded eggs strewn around. You don't really know what to make of that, though. A snake could have eaten them or they might have been ejected by the parent and the squirrels moved in afterward. It's kind of hard to piece together.

"We had one case in 1982 where I found a clutch of eggs in one cavity. When I went back to check on them a couple of weeks later a flying squirrel was in the cavity sitting on top of a decomposing red-cockaded. I don't know for sure if it killed the woodpecker."

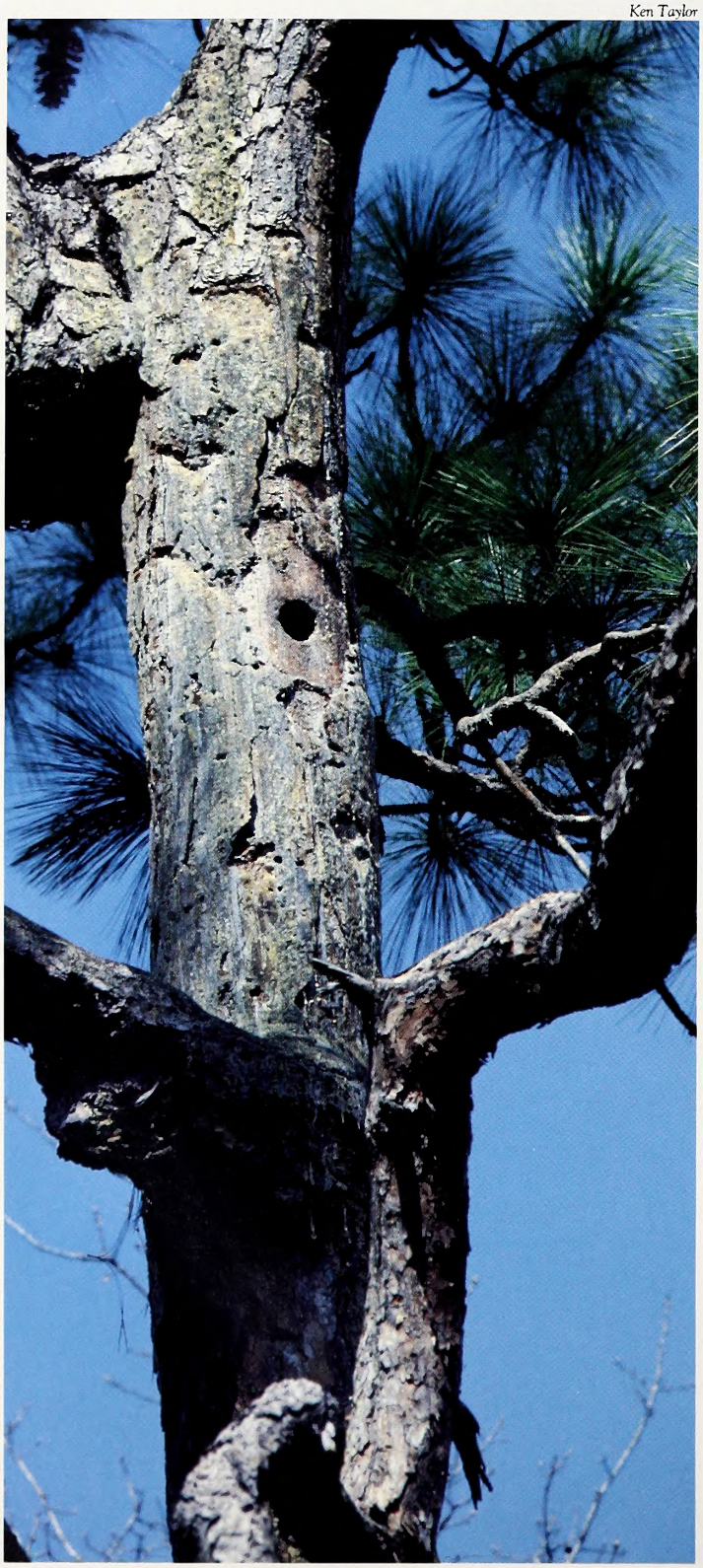
Still, Carter is fairly sure that flying squirrels are predators of red-cockaded woodpeckers. "We know for a fact that they take eggs of other birds — bluebird eggs, as well as young bluebirds. So there's no reason to expect that they wouldn't take red-cockaded young."

The competition between the flying squirrel and the red-cockaded woodpecker is natural, to a certain extent. Unfortunately, it may have intensified over the past 60 or 70 years. Although the flying squirrel is not the only competitor, Jay Carter thinks that in the Sandhills it is the major one.

The cause of this intensified competition is, not surprisingly, man. Once a great longleaf pine forest stretched from Virginia down through Florida and over as far west as eastern Texas, 60

Cavities in old pine trees (below) are sought for nesting and roosting sites by both the flying squirrel and the red-cockaded woodpecker. The flying squirrel is the opportunist, often robbing the red-cockaded of the home that takes months and sometimes years to build. The two species once coexisted when longleaf pine forests covered the eastern coast. The destruction of that forest intensifies the competition between the two creatures for the remaining tree cavities.

Ken Taylor



Leonard Lee Rue, III

Ken Taylor

Carter found a flying squirrel and a red-cockaded woodpecker wedged so tightly together in a cavity that they were fused into the resinous walls. He hypothesizes that an incoming squirrel met an outgoing woodpecker and like Laurel and Hardy got stuck in the door.

million acres of predominantly longleaf pines. Along the stream bottoms, hardwoods grew. In this forest many species of wildlife thrived, including the red-cockaded woodpecker. The red-cockaded requires large numbers of older live pine trees for its cavity-making activities and there were plenty of them in the pine forest.

Because the bird makes its cavity by excavating tough live wood, not softer dead wood, cavity-making takes a long time. The labor of several generations of woodpeckers may be needed before the cavity is completed. The excavation begins with a tunnel 6 inches long, angling upward so the resin will drain out. Then when the birds meet heartwood, they tunnel downward, digging a chamber anywhere from 6 to 10 inches deep and 3 to 5 inches wide. The red-cockadeds also chip small holes, called "resin wells," into the bark around the cavity entrance which causes resin to coat the trunk, possibly deterring some predators.

Of the 60 million acres of the virgin pine forest, nothing survived the timbering operations that swept down the coast in a destructive arc early in this century. Only 10 million acres of second-growth forest remain and development today is gobbling this up. The Sandhills pines are mostly second growth, and Carter believes a Piedmont type of vegetation is muscling in bringing with it a dense understory of hardwood shrubs that support red-cockaded competitors like the red-bellied woodpecker, a bird that was not common in the original forest. Carter guesses that flying squirrels are now more common in this new habitat than they were formerly. "Flying squirrels are probably riding the crest of the wave, so to speak, so far as their population is concerned," he says.

Peter Weigl is not as sure of this. Weigl is a Professor of Biology at Wake Forest University who has also been working the Sandhills area and has studied flying squirrels for 20 years. He argues that flying squirrels have always inhabited red-cockaded habitat in substantial numbers.

"Flying squirrels are particularly abundant in open pine forest for two reasons," he says. "One, they can get from tree to tree easily, by gliding. In fact some of the literature says that flying squirrels are at an advantage in areas of widely spaced, branchless trees. This is not true for the gray squirrel which needs branches to travel by.

"Secondly, the original pine forests had a lot of large acorn-producing turkey oaks in them which fed flying squirrels. And even where food is scarce, the flying squirrel has an advantage because it is so small it can make do on less."

Weigl agrees with Carter, however, that loss of habitat is causing the competitive crunch that exists today. "The loggers not only took most of the big pines, but also the big oaks which provided alternate nesting sites for flying squirrels. The reduction in the number of pines and oaks put a premium on whatever trees were left."

"Are the flying squirrels filling a vacuum," asks Weigl, "or are they affecting the red-cockaded populations?" It's hard to tell and the data is not complete. One thing is certain, however. The numbers of red-cockadeds continue to decline.

"The population has dropped about 20 percent in the last three years," says Carter. "The drop from 1980 to 1981 was not terrible, but it was significant. The drop from 1981 to 1982 was something to take your breath away. This year things have more or less stabilized."

What can be done? Carter doesn't really know. "Flying squirrels can get in such small areas that there's probably no way to keep them out," he says. "And it would be costly and not very popular to wage any sort of campaign of attrition against them. Fruitless, too, considering how many of them are out there."

Carter believes that the key to reducing competition between the two animals is habitat. "The best way to manage red-cockaded woodpeckers — and it's true for any species — is to manage habitat. What's needed is a habitat that has plenty of existing cavity trees as well as plenty of potential cavity trees. Plus habitat that is relatively free of an encroaching hardwood understory," he says.

"Fire has been so successfully excluded from the Sandhills that dense understories 12 to 20 feet high are widespread, with heights of 30 to 60 feet on the more fertile soils."

Peter Weigl says that frequent fires are important in controlling the understory and helping to recreate the original conditions in which flying squirrels and red-cockaded woodpeckers coexisted. "Fires burn out scrubby hardwoods, and leave the ground floor open. Large pines and oaks are left. You want fires to burn 90 percent of the brush and small trees. But you also want a scattering of turkey oak and other seedlings to escape along with the large pines and oaks. The presence of oaks will provide habitat and food for predators like raccoons and possums that would help control the flying squirrel population."

Jay Carter has been studying red-cockaded woodpeckers now for five years, and he feels very protective toward his endangered charges. He monitors their numbers, their birth rates, their mortality rates. The study was originally funded by the N.C. Wildlife Commission through money received from the Endangered Species Act. A rather abrupt cessation of funds after President Ronald Reagan took office has caused the project to hang fire. As a result Carter is now the only full-time worker keeping track of 3,300 cavity trees and 1,800 red-cockaded woodpeckers.

So Carter continues to stalk the Sandhills, rapping on pines and shaking his head as a squadron of flying squirrels emerge from a single tree cavity. He's seen as many as seven crawl out of a hole, although the record is about 50.

Carter isn't hostile to the tiny squirrels. "They're nice little critters," he says. "Little pink noses and floppy ears and all. When I was younger I had a flying squirrel pet. It was so small it could crawl through the space under doors. It used to hide acorns and nuts in the drapes so that whenever anyone pulled them open a shower of nuts would fall on the floor."

He shakes his head and grins. "They make nice pets. If I weren't working with a restricted population of an endangered species I probably wouldn't be so hard on them. But there are so few of these birds now that every one is worth worrying about." ⊠

Donations Sought For Artificial Reef

Mothballed Liberty Ship May Get New Life

Written and Edited by Mark Taylor

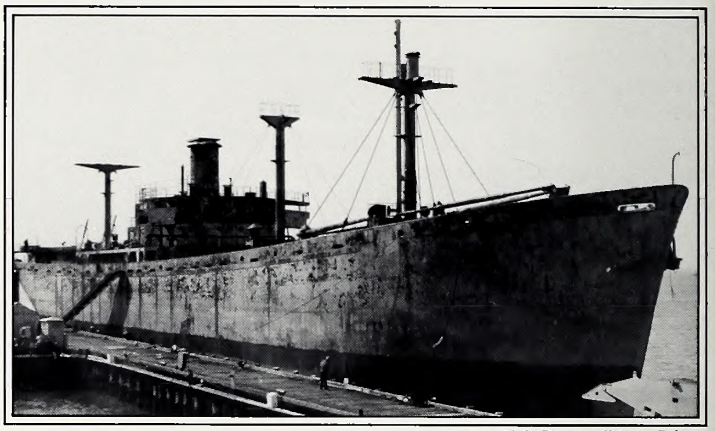
Would you like to improve the salt water fishing off the North Carolina coast? If so, do your patriotic duty and help send the World War II Liberty ship *Protector* to the bottom.

The 441-foot *Protector* is one of the last mothballed Liberty ships to be made available for artificial reefs, and a project sponsored by the Carteret County Chamber of Commerce and the North Carolina Marine Education and Resources Foundation would sink the *Protector* in approximately 70-80 feet of water about 10 to 12 miles off the coast of Carteret County. The exact site hasn't yet been selected, but the artificial reef would be well-marked. Preparing and sinking the *Protector* as an artificial reef may cost $80,000 to $100,000, and contributions are being sought from salt water fishermen and businesses.

"Before the *Protector* can be sunk, she must be cleaned so there will be no pollution problems," said Jim Brown, supervisor of the artificial reef program for the N.C. Division of Marine Fisheries. "This work must be done by a commercial shipyard, and donations are needed. There are one million anglers who fish in salt water on the North Carolina coast, so if a lot of fishermen and divers contribute small amounts we'll soon have the money we need."

Coastal fishermen know that some of the best fishing is found around the wrecks of ships sunk in World War II. This artificial reef would serve the same purpose. "A whole food chain quickly builds up around a wreck," said Brown. "We've found vast schools of bait fish around artificial reefs a week after they've been sunk, and these bait fish quickly attract sport fish like sheepshead, sea bass, sharks, amberjack, Spanish and king mackerel, and many others. Depending on the type of bottom and currents where an artificial reef is sunk, these structures can be effective for 50 to 100 years. Fishing and diving are excellent around these wrecks and artificial reefs."

For more information about the program, or to make a contribution, write to the Cape Lookout Artificial Reef Fund, P.O. Box 1758, Morehead City, N.C. 28557.



N.C. Division of Marine Fisheries

Put Her Down: *The Liberty Ship* Protector *has been idle for about 30 years, and is one of the last Liberty ships left in the "mothball" fleet in the James River in Virginia. The Carteret County Chamber of Commerce and the N.C. Marine Education and Resources Foundation are attempting to obtain the* Protector *for an artificial reef, which would be located off Carteret County. The project will cost an estimated $80,000 to $100,000 and contributions are being sought from coastal businesses, sport fishermen, and divers.*

Help Build A Future For Nongame Wildlife

The U.S. Fish and Wildlife Service reports that over half the nation participates in some form of nonconsumptive wildlife recreation. For the first time North Carolinians will have the opportunity to support the management and protection of nongame and endangered species through the nongame tax checkoff. The checkoff allows residents of North Carolina receiving a refund from their state income tax to designate that a portion or all of the refund be used for management and protection of nongame and endangered wildlife.

"We urge all North Carolinians to support the nongame tax checkoff," said Jack Donnelly, coordinator of the nongame program for the N.C. Wildlife Resources Commission. "In the immediate future, the tax checkoff will fund restoration and management programs for bald eagles, peregrine falcons, and loggerhead sea turtles. Funds will also be used to further develop a statewide environmental-education program for our schools."

Start by taking a close look at the instructions for your 1983 North Carolina State Income Tax form. On page 2 in the lower right-hand corner are instructions on how to contribute to the North Carolina Nongame Wildlife Fund. If you wish to support this fund, enter a donation from your refund on line 21 of the tax form. You may designate a portion of your refund (not less than $1) or all of your refund to be used to protect nongame and endangered species. This donation will not increase the tax you pay, and may be deducted from your income on the following year's tax form. If your tax returns are prepared professionally, tell your accountant that you wish to contribute to the nongame wildlife fund.

If you aren't receiving a refund but wish to contribute to the nongame wildlife fund, tax-deductible contributions may be sent to the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611. Please note on the check that the proceeds are to be used for nongame and endangered species.

Gator Comes Calling

Fisherman Hosts An Uninvited Dinner Guest

Splash! Swish! Slap! Watery sounds from the nearby creek broke the nocturnal din of bloodthirsty mosquitoes rising from the brackish marsh near our trailer in coastal Onslow County. The thrashing continued for several minutes before subsiding, and newly arrived miniature hypodermic syringes on wings soon initiated our own slapping. Yet, what could be making those thrashing sounds in the nearby creek?

Early the next morning, I slipped into my swimming trunks and prepared myself psychologically to plunge into the cold, black waters of Mill Creek. I had set my 30-foot gill net in the creek the night before hoping to snare a few mullets, croakers, or even a flounder for our Saturday evening supper. I am one of many weekend commercial-sport fishermen who work upstate during the week while our hearts and minds remain in tidewater.

Goose bumps sprang up on my arms and chest as I slowly submerged myself for the invigorating swim to the net, which was now 50 yards from where I had set it the night before. Moving along the net, I lifted the cork line to find only the heads of two bluefish, a black drum, and two mullets. No fish dinner tonight! At first, I thought blue crabs had feasted on these fish, but then I recalled the thrashing sounds of the previous evening. What could have moved the net? Did other fishermen raid the net during the night? I decided to set the net again and see.

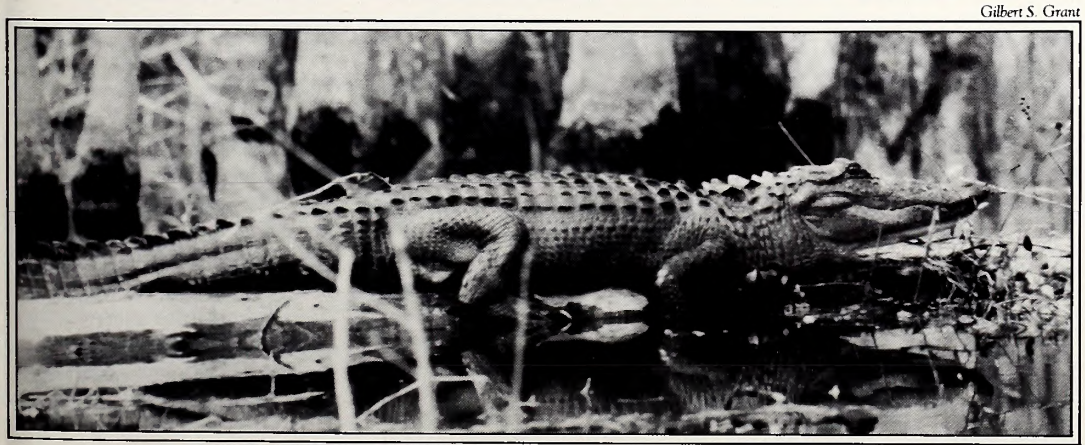
Sure enough, that night I woke again to splashing sounds. I covered myself with bug repellent and grabbed my flashlight before slipping into the darkness. To my amazement, I found an alligator "fishing" the net. After all, the fish were easy prey — just like picking food off the dinner table. For 30 minutes or so, I watched while the alligator thrashed about in the net and ate several fish that were entangled in the meshes. In the process, the alligator became briefly tangled himself, and swam off with the net.

Early the next morning, the net was nowhere to be seen. Later, I found it had been dragged 150 yards upstream and deposited around an old, decaying cypress stump at the edge of the creek. I soon discovered the alligator's haunt, and spent many hours observing and photographing our reptilian neighbor as he sunbathed on the edge of the marsh. The time spent inching forward on my belly through the marsh of sharpened needlerush while thorns of wild blackberries tore at my skin and clothes (not to mention the herds of chiggers acquired on these outings) to obtain glimpses and photos of the alligator culminated in a growing appreciation and respect for my "dinner guest." Fearing he might drown in the net, I decided to stop net fishing until winter cold forced our alligator into hibernation. He is now part of the charm of our retreat from the hustle and bustle of city life.

— *Gilbert S. Grant*
Raleigh

Working On The Night Shift: *This basking alligator made a habit of conducting nocturnal raids on the author's gill-net in coastal Onslow County. His solution to the problem was to quit fishing, and to spend his time photographing the interesting creature instead.*

Gilbert S. Grant



Boat Law Changes

Several changes in boat registration laws were enacted at the request of the Wildlife Resources Commission by the 1983 Session of the North Carolina General Assembly. Sailboats over 14 feet in length at the load waterline and boats of any size using only electric motors must now be registered with the N.C. Wildlife Resources Commission.

"Sportsmen and sailors should register these boats as soon as possible," said Helen Gournas, supervisor of the Wildlife Commission's Boat Registration Section. "By registering soon, boaters will be able to avoid the delays that occur when everyone tries to register his boat at the same time in the spring."

First-time boat registrations may not be handled through boat registration agents (as renewals of registrations are). To save time, however, boaters may pick up the registration forms from boat-registration agents and marine dealers and mail the registration forms with the registration fee to the Wildlife Commission in Raleigh. The registration fees are $5.50 for one year and $13 for three years. Registration forms and fees should be sent to the N.C. Wildlife Resources Commission, Boat Registration Section, 512 N. Salisbury St., Raleigh, N.C. 27611.

Orphan Mines Finally Adopted

Land Damaged By Mines Being Reclaimed

An abandoned mine is a lonely place. Rain quickly gullies the site, washing sand and gravel from the pit and tailing piles into nearby creeks and rivers. Only the most tenacious weeds are able to gain a foothold in the white, sterile landscape.

There are many abandoned mines in North Carolina, and these "orphan mines" are especially common in the high country of Mitchell, Avery and Yancey counties. In these areas, however, concerned citizens, local mining companies, soil and water conservation districts, and county, state and federal government agencies are working together to put these orphan mines back into productive use — often as forests or wildlife areas.

"For the past two years, we've had a program to reclaim orphan mines," said Jim Simons, a mining specialist with the N.C. Division of Land Resources. "Orphan mines were abandoned before the North Carolina Mining Act of 1971 was passed, and no reclamation was required for these mines. Any mine that has been in operation since the Act was passed, however, must be reclaimed to productive use."

Problems with water quality prompted the development of the program in 1981. The Tennessee Valley Authority was experiencing siltation problems in several water-supply reservoirs in Tennessee which were fed by the North and South Toe and Nolichucky rivers in western North Carolina. The siltation problems were at least partially caused by the large numbers of abandoned mica, feldspar and kaolin mines in the tri-county Spruce Pine area.

Jim Simons

Before And After: *The Celo Mine in Yancey County borders the South Toe River, and was abandoned in the late 1950s like many other mines in the area. For over 20 years, erosion from the Celo Mine caused serious siltation problems in the river. In the spring of 1982, however, the abandoned mine was reclaimed. The site was graded, erosion-control structures were installed, native grasses were seeded, and seedling autumn olives and white pines were planted. Consequently, erosion from the mine has been curtailed, and the site offers excellent wildlife habitat.*

This area had experienced a small mining boom beginning in World War II when sheet mica, which was widely used as an insulator in electronics, was needed for the war effort. This boom continued throughout the Korean Conflict and the Cold War. When the federal government halted subsidies and loans to the mica industry in the early 1960s, the boom collapsed and many marginal mines shut down — and have been eroding ever since.

"In 1981, TVA agreed to provide $50,000 plus manpower and expertise to reclaim mines that were causing water-quality problems in the Toe River watersheds," said Simons. "In 1982, TVA provided an additional $100,000 for the project, and the State contributed $7,500 plus manpower and large numbers of seedlings for reforestation.

"The first task was to identify all of the orphan mines in the three-county area, and to determine which were causing water-quality problems. We found that there were 155 orphan mines covering 1,445 acres in Yancey, Mitchell and Avery counties. Of this total, 607 acres were eroding and causing water-quality problems and needed reclamation.

The first step in reclaiming an orphan mine is to stabilize the eroding area. This is usually done with water bars, drainage ditches and other structures. If necessary, the area is also graded with heavy equipment which is often provided and operated free of charge by local mining companies. Steep slopes are usually "hydro-seeded" with native grasses. The final step is to plant the seeded area in wildlife shrubs and white pines which are provided by the N.C. Division of Forest Resources.

"This reclamation process has worked very well, and we've never had a program that received more public support," said Simons. "The cooperation between government agencies, citizens groups, soil and water conservation districts, landowners, mining companies and others has been great. So far, we've reclaimed 250 acres of orphan mines in this area, and another 357 acres still need treatment."

The cost of reclaiming orphan mines — even with the generous donations of equipment, expertise and manpower from all of the groups involved in the program — runs high. On areas needing extensive reclamation, the cost is $1,000 to $1,500 per acre, and costs overall average $800 per acre.

"There are probably orphan mines which need reclamation in every county in the mountains," said Simons. "Continuation of this project will depend on finding additional sources of funding. There's a real need to reclaim these areas for everyone's sake."

Two For Price Of One

Wildlife Calendars On Sale

Wildlife art enthusiasts are in luck — for $5, they may obtain copies of both the 1982-83 and 1983-84 North Carolina Wildlife Calendars. These calendars feature a beautiful series of wildlife prints, and have been very popular as calendars and also with collectors and hobbyists who frame or use the prints in crafts projects. Artists featured in the calendars include Bob Binks, Bob Dance, Cecil Eakins, Larry Barton, Duane Raver, Lee LeBlanc, Bob Timberlake, Sally Middleton, and Don Balke. The calendars were produced by the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the N.C. Wildlife Resources Commission to provide information, guidance, and support for agency conservation programs. Proceeds from the calendars will be used for these purposes.

"These calendars have been tremendously popular, and are beautiful additions to anyone's home or office," said George Mason, chairman of the Chairman's Wildlife Advisory Committee, "They also make fine Christmas gifts. There is a limited quantity left, so we're offering both calendars for the price of one. The calendars will be sold on a first-come, first-served basis until the supply is exhausted."

Calendars may be ordered by sending $5 to the Chairman's Wildlife Advisory Committee, % George Mason, P.O. Box 473, Dallas, N.C. 28034. Checks should be made payable to the Chairman's Wildlife Advisory Committee.

Book Review

Requiem For A Fish?

Striper: A Story of Fish and Man by John Cole. Little, Brown and Company, 1978. 263 pp. $6.95 softcover.

Readers of *National Wildlife* and other nature magazines know the name John Cole, and the Maine author has written a powerful plea for a better world in his book, *Striper: A Story of Fish and Man.* Although this book has been on the market for several years, those who haven't read it are missing a treat.

Cole spent seven years as a commercial fisherman haul-seining for stripers from the beaches of Long Island in the early 1950s, and the natural history of the striped bass is told through the eyes of the fishermen. These men eat, sleep and live by the habits and migrations of the fish that they seek. The book is more than a nature story, however, it is also rich in humor. Readers share the brotherly, earthy camaraderie of a hard-working fishing crew, and feel affection for the old Long Islander who takes a handful of young, enthusiastic novices and turns them into commercial fishermen.

The book concludes with several chapters documenting the continued decline of the striper bass caused largely by the pollution of Chesapeake Bay, the world's richest estuary, and the Hudson River. However, readers could substitute the words "Albemarle Sound and Roanoke River" for "Chesapeake Bay" and have an accurate description of the plight of the striper in North Carolina.

Rabbit Dishes Are Simple To Make

February rabbit hunting is a long-standing tradition in North Carolina, and the list of those who pursue the sport generally includes the youngest and oldest of hunters. When the air is brittle and the frost heavy, the bawl of beagles hot on a trail cannot be denied.

Not surprisingly, rabbit dishes also have a long-standing tradition in North Carolina. Many of them — like many North Carolinians — have a German heritage, but it is southern-fried rabbit that probably shows up most often here. Southern-fired rabbit has lasting appeal because it is simple to prepare and the meat from most rabbits is mild, tender and flavorful. To prepare it, pieces of rabbit are shaken in a paper bag which contains flour seasoned with salt and pepper, and then browned on all sides in cooking oil. A little water is added to the frying pan along with a pinch or two of marjoram, thyme, or another favorite herb. The pan is covered, heat turned to simmer, and the rabbit allowed to cook until tender. It's simple but delicious!

If you've been eating southern-fried rabbit since the season came in last November, however, you're probably ready for a change of menu. Try the following recipe:

STUFFED RABBIT, GERMAN STYLE

1 whole rabbit
stuffing
4 tablespoons butter
3 whole red potatoes, washed
3 whole carrots, scraped
3/4 cup chicken bouillon

Dry rabbit and fill chest cavity with stuffing. Close opening with toothpicks and string. Force rabbit into a round ball and truss with additional string. Brown on all sides in butter in a Dutch oven. Add potatoes, carrots and bouillon to pot and cover. Put in 350-degree oven for 2 1/2 hours, turning rabbit after 1 1/2 hours. Serve on a heated platter.

Mix two tablespoons of flour with one cup of water and add to pan juices. Heat, stirring constantly, until mixture boils and thickens. Serve as gravy.

Stuffing

1/2 pound pork
1/2 pound veal
6 slices bacon
salt and pepper
1 clove garlic, minced
1 teaspoon parsley, minced

Grind pork, veal and bacon together. Add salt and pepper, garlic and parsley and mix well. Stuff rabbit.

The mild gaminess of rabbit goes well with a similarly mild white wine, such as a California Rhine, Moselle or Riesling. Enjoy.

— *Curtis Wooten*

Bowhunters Support Wildlife

Ken Taylor

A Welcome Gift: *The North Carolina Bowhunters Association recently presented the Wildlife Commission with a $1,000 contribution to be used for rabbit and black bear projects in the State. Here, Dennis Allman (right) of the Bowhunters Association presents the contribution to Vernon Bevill, executive director of the Wildlife Commission.*

Quail Season Ends February 29

Hunters are reminded that the quail season closes this month — on Wednesday, February 29. The bag limits are 10 birds daily with a possession limit of 20.

By late winter, quail are generally scattered. Hunting in thicker cover, and the woods, will often pay dividends for the late-season quail hunter.

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status On October 31, 1983

Numbers Sold	Revenue	Received
Lifetime Sportsman's License	6,359	$1,891,369
Lifetime Hunting License	75	12,736
Lifetime Fishing License	273	44,504
Lifetime Subscriptions to Wildlife in N.C.	205	22,676
Contributions	—	30,251
	Fund Total:	$2,001,539

Calendar Of Events

February 1-3
Southern Farm Show at the State Fairgrounds in Raleigh.

February 1-5
Mid-Atlantic Boat Show at the Civic Center in Charlotte.

February 4
2nd annual Black Mountain-Mt. Mitchell Cross-Country Ski Challenge. For more information, contact the Chamber of Commerce, 201 East State St., Black Mountain, N.C. 28711. Call 704-669-2300 to check on snow conditions.

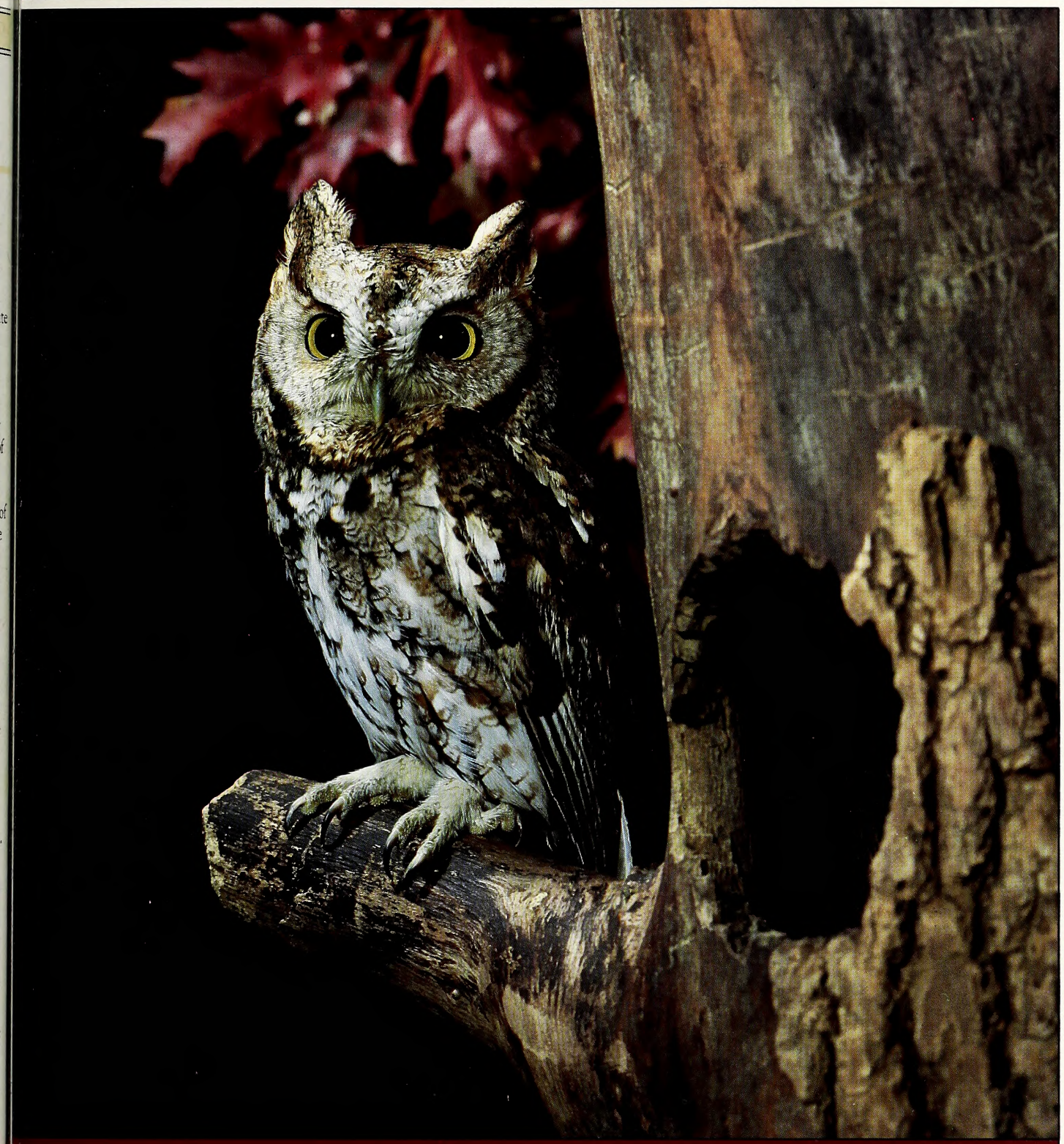
February 17-19
Southeastern Wildlife Exposition in Charleston, South Carolina. Features wildlife art, decoys, sporting artifacts, and other exhibits. For more information, write to the Southeastern Wildlife Exposition, 606 Trolley Road, Summerville, S.C. 29483 or call 803-785-3170.

February 18-10
Gun Show at the State Fairgrounds in Raleigh.

February 24-25
Dixie Deer Classic at the State Fairgrounds in Raleigh. Sponsored by the Wake County Wildlife Club, this annual event features competition for the best deer taken in the State, exhibits of mounts, prominent speakers on deer hunting, and demonstrations and exhibits of hunting equipment. For more information, contact the Wake County Wildlife Club, P.O. Box 12202, Raleigh, N.C. 27605.

February 24-26
SEAS '84 Diving Conference and Underwater Film Festival at the Radisson Hotel and the Civic Center in Raleigh. Features seminars on diving, underwater photography, and underwater films. For more information, contact the N.C. Office of Marine Affairs, 116 W. Jones St., Raleigh, N.C. 27611 or call 919-733-2290.

February 26
208th Anniversary of the Battle of Moores Creek Bridge at the Moores Creek National Battlefield in Currie. For more information, contact the Moores Creek National Battlefield, P.O. Box 69, Currie, N.C. 28435 or call 919-283-5573.



Steve Maslowski

Check-In For Wildlife

NOT EVERY CREATURE is wise enough to survive without your help. Your tax-deductible donation will ensure a future for nongame and endangered wildlife.

Look for line 21 on your 1983 State Income Tax form D-400 and enter your contribution.

Sunrise Ducks
The first rays of sunlight warm not only rafts of feeding ducks, but also the hearts of those who are fortunate enough to share the moment.

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WILDLIFE IN NORTH CAROLINA

MARCH, 1984 75 CENTS

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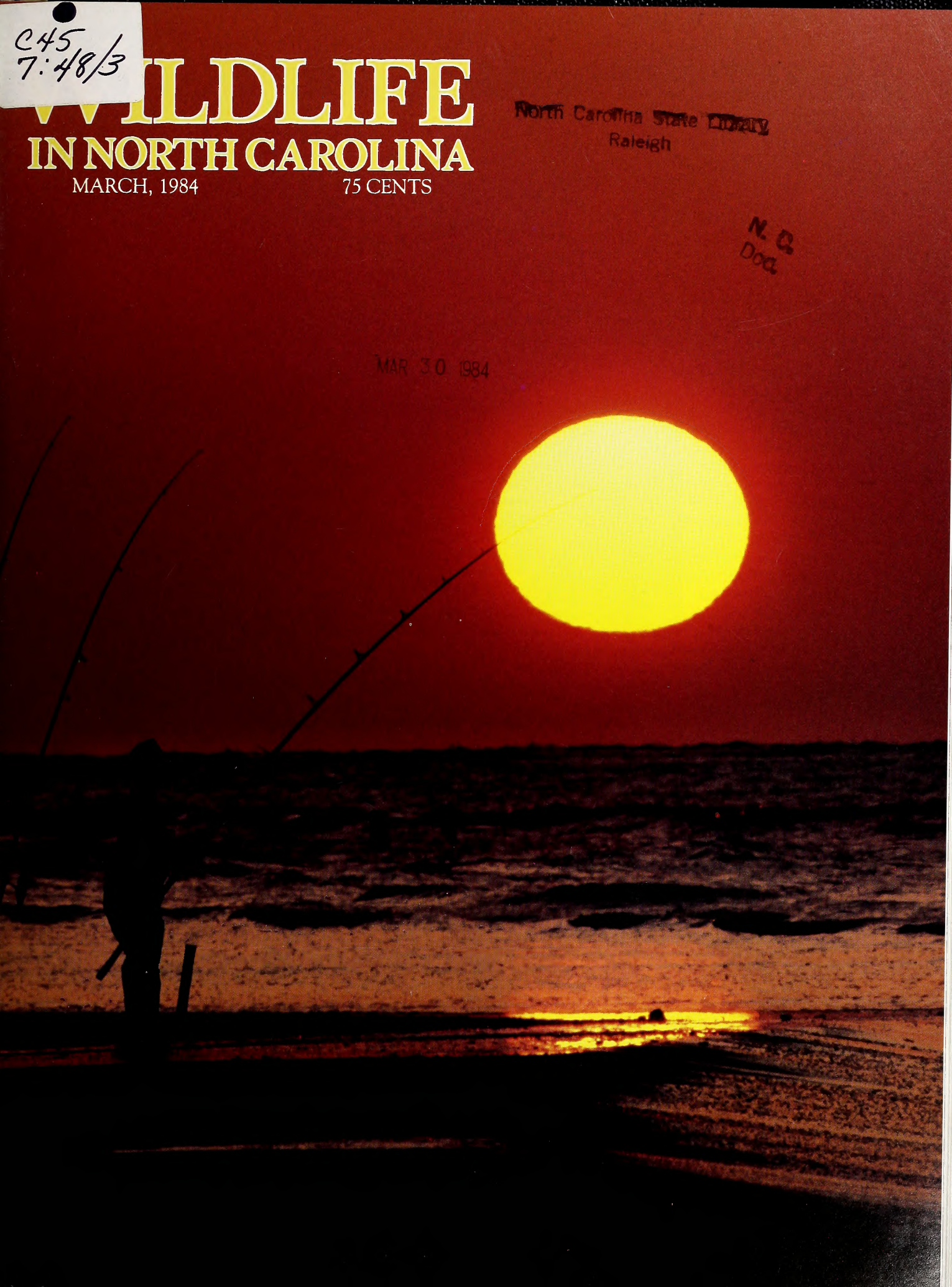

Voices Of Spring

by Jim Dean

Every year, spring catches up with me in a different place. Last year, I was driving down a country road past a wooded bog when spring came floating in the window. The year before, it smacked me in the ear as I walked out on the porch of a mountain cabin.

For me — and I suspect many others — the harbinger of this fine time of the year is not marked by the vernal equinox or by the appearance of crocus poking through the dead leaves beside the back porch. Rather, it is that moment when I hear the first chorus of spring peepers. That sound is arguably the sweetest in nature, filled with cheerful promise — that is, if you can forget that what you're hearing are the combined voices of countless frustrated amphibians singing lustily for a mate.

Jane Rohling

The green treefrog is part of spring's annual chorus

I have always liked the songs of frogs, and toads as well, and that is not too surprising since one of my earliest memories is of falling asleep in my grandmother's front bedroom while bullfrogs sang bass in the roadside ditch, and toads cranked out a steady "yaaannk" under the window. Even now when most of us are sealed in air-conditioning from April through October, I'd rather have a window open at night.

No doubt you have similar early memories. Rare is the kid who has not kept tadpoles in a jar and watched them change into frogs, or delighted at the sudden appearance of thousands of tiny toads near a pond. At school, there was no wealth as great as a frog or toad in your pocket where such a creature was both a secret companion and a weapon to be tossed like a grenade into some unsuspecting group.

Early on, many of us believed toads caused warts. I also believed that an elderly man named King who lived across the street could rub a wart and make it disappear. He rubbed a wart I had on my elbow, and sure enough the very next week I fell while roller skating and scraped it off. I had hoped for a more mystical removal, but I couldn't argue with the results.

Of course, most people now know that toads don't cause warts, but I suspect that's about all they know about these creatures — or care. The readers of this magazine may find toads and frogs interesting, but what about the rest of our fellow humans? To be perfectly honest, most people lose their interest in those amphibians pretty early.

The average person doesn't even know the difference between a toad and a frog, calling them all "toadfrogs." It is of little interest to most folks that toads have dry, warty skin and hop, or that frogs have moist, relatively smooth skin and leap. To many people, frogs and toads are equally disgusting — the Rodney Dangerfields of the wildlife world. They get no respect.

If game species like deer, quail or largemouth bass get in trouble, sportsmen will gladly pass regulations and pay whopping sums of money to make sure their favorite species doesn't bite the dust. Indeed, sportsmen have been so effective that the future for game species has been brighter than for most nongame species.

Of course, songbirds have their champions, too, thank goodness. When DDT and other pesticides threatened countless birds, Rachel Carson wrote "Silent Spring," and it became a runaway best seller. But who looks after the countless other wildlife species? Where is their constituency? A spring without the songs of toads or frogs would be pretty quiet, too, yet if these amphibians were threatened, who would leap (or hop) to their defense?

Until this year, I'm not sure I could have answered that question. Now, at least the means exists for protecting obscure or largely ignored wildlife species. And not just amphibians, but all sorts of creatures that lack fan clubs with clout.

Throughout the country, a new concept is gaining a foothold. It's called the tax checkoff, and this year is North Carolina's first try at it (see the inside back cover). In each state, it works about the same way. When they file, taxpayers can designate a part or all of their tax refund to go for the management and protection of nongame or endangered wildlife. The donation is tax deductible the following year.

Nongame species, by the way, are those for which there is no legal hunting or fishing season, and that includes most wildlife species. Everything from snails to chipmunks, songbirds to toads falls into this category. Of course, officially endangered species like bald eagles are also covered under this program. The North Carolina Wildlife Resources Commission expects to get well over a hundred thousand bucks the first year, and some states have done far better than that.

With that kind of money coming in on an annual basis, these nongame and endangered species programs are going to grow rapidly after the first few years. Within 10 years, the shape of wildlife management in this nation may forever be changed. Indeed, the biggest problem may be finding a way to keep traditional game management programs intact and well-funded. In the long run, however, all wildlife species should benefit since many game, nongame and endangered species share the same habitat.

You might keep that in mind when you hear those spring peepers, and also when you fill out your tax form. It might be the only bright spot of your day.

North Carolina State Library
Raleigh

March, 1984
Volume 48, Number 3

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

N. C.
Doc.

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DEPARTMENTS

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Cover *At sunrise, anglers on the beach at Portsmouth Island tend their rods and wait for the strike of a channel bass, or perhaps some smaller fish that samples the bait.*

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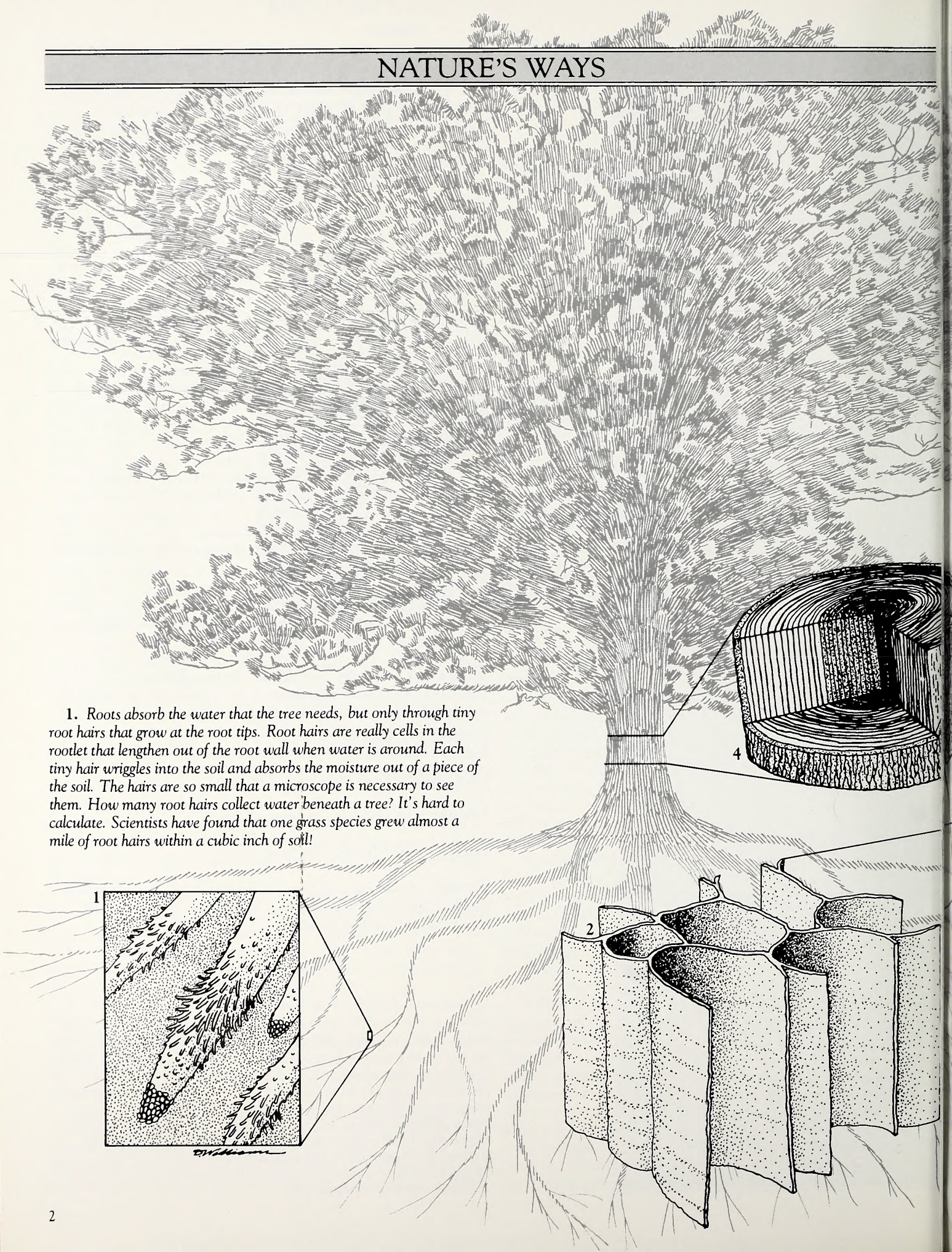
1. *Roots absorb the water that the tree needs, but only through tiny root hairs that grow at the root tips. Root hairs are really cells in the rootlet that lengthen out of the root wall when water is around. Each tiny hair wriggles into the soil and absorbs the moisture out of a piece of the soil. The hairs are so small that a microscope is necessary to see them. How many root hairs collect water beneath a tree? It's hard to calculate. Scientists have found that one grass species grew almost a mile of root hairs within a cubic inch of soil!*



Rivers Of Life

written by Lawrence S. Earley / illustrated by David Williams

As winter loosens its grip on us, nature sings of its coming rebirth in liquid notes. Listen! You can hear the water flowing almost everywhere. Leaf-glutted channels that were as dry as gulches last fall are burbling rivulets now. Rivers run full-throated on their ways to the sea. Underfoot, the ground is saturated with winter's plentiful rains.

Put your ear to a tree. Hear the rivers running? Probably not. Inside trees, however, there are rivers that are rising to the skies, rivers that we never see. Rivers of life, they are, for the rainwater that enters the tree's roots will eventually mix with air in the leaves, and through the magic of the leaf's chlorophyll, it will make sugars and starches, the basic foods of all living things. We call that process *photosynthesis.* The rivers of life within the tree make it possible.

But how does water flow up a tree, 100 feet high in the case of some oaks and a good deal higher in redwoods? Let's examine this remarkable achievement of plants and trees.

The process starts with the tree's root system. Trees absorb very little water through their bark and leaves; most of the tree's water enters through its roots. Some trees have roots that grow deep within the soil. The roots of other trees radiate out just below the surface. As they get farther away from the tree trunk they gradually get smaller until they end in rootlets less than an inch in diameter. We need a microscope now, for at the tips of these tiny rootlets grow thousands of microscopic root hairs. Each root hair absorbs the moisture from a tiny piece of soil. So numerous are these water-absorbing root hairs that an apple tree, for example, can take in four gallons in an hour.

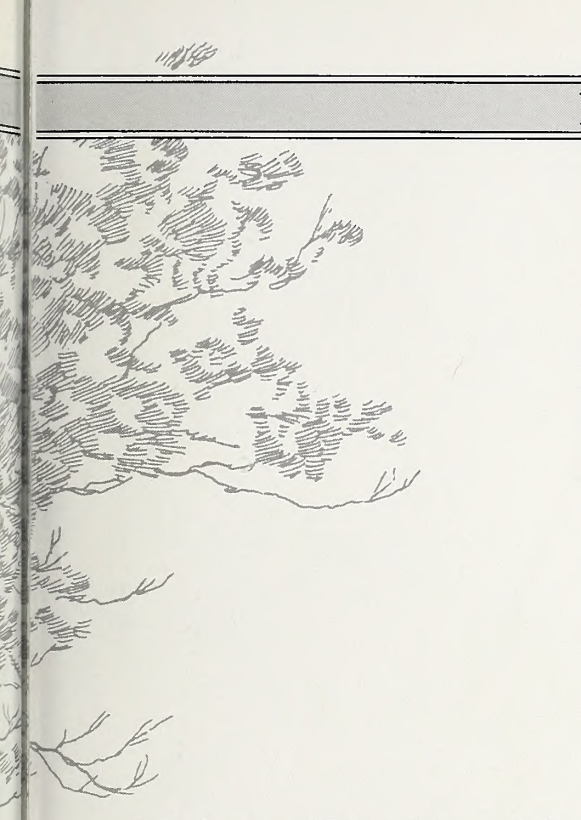
Once absorbed, the water travels through the tree trunk via billions of hollow cells. These cells are arranged end to end lengthwise up a hardwood tree, creating a threadlike tube that connects the roots to the leaves and to other growing parts of the tree. Each year many thousands of new leaves and buds grow on a tree, and many thousands of new tubes are created to carry water to them. One might think that these hollow tubes would make the tree weak along its length, and so they do. We call this weakness the wood's grain, and we take advantage of it when we want to split wood for our fireplaces. We split our wood along the grain, or along the water-bearing tubes.

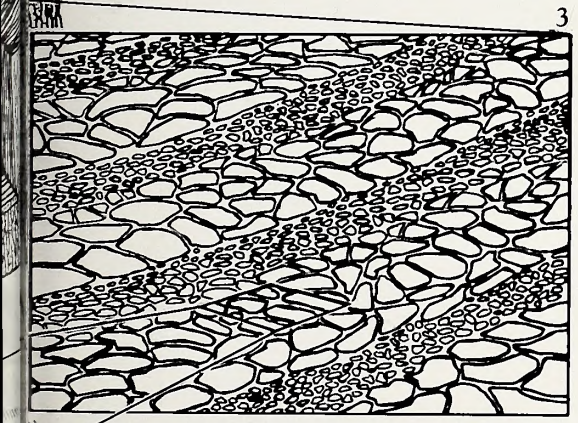
The tubes eventually pass into the leaf, and the water enters a myriad of veins in the leaf. Here is where carbohydrates are made, the food the tree needs for its growth. Some of the water that enters the leaf is taken up by this process, but much more evaporates out of pores, called *stomata,* on the surface of the leaf. This loss of water vapor is called transpiration.

But we haven't answered our question. For how can water overcome the force of gravity, and the resistance of the tube walls, to reach a leaf on a branch 100 feet high?

It was a question that stumped botanists for many years, and even today they can offer only a theory to explain it. Think of the tree as containing an unbroken column of water, they say. Water molecules have such an attraction for each other that when one is evaporated from the leaf, it pulls its neighboring water molecule into its space. This causes the entire column to move up, pulling more water out of the ground. The naturalist Rutherford Platt puts it this way: "From roots to tiptops runs an unbroken 'rope' of water, woven out of countless threads. Pull on the top of this by evaporating water out of the leaves and you simply pull up more water by its own rope." How high can the sap column be raised before gravity and other forces cause it to break? Almost a mile, scientists say.

The rivers that we never see this spring are the most important rivers of all.



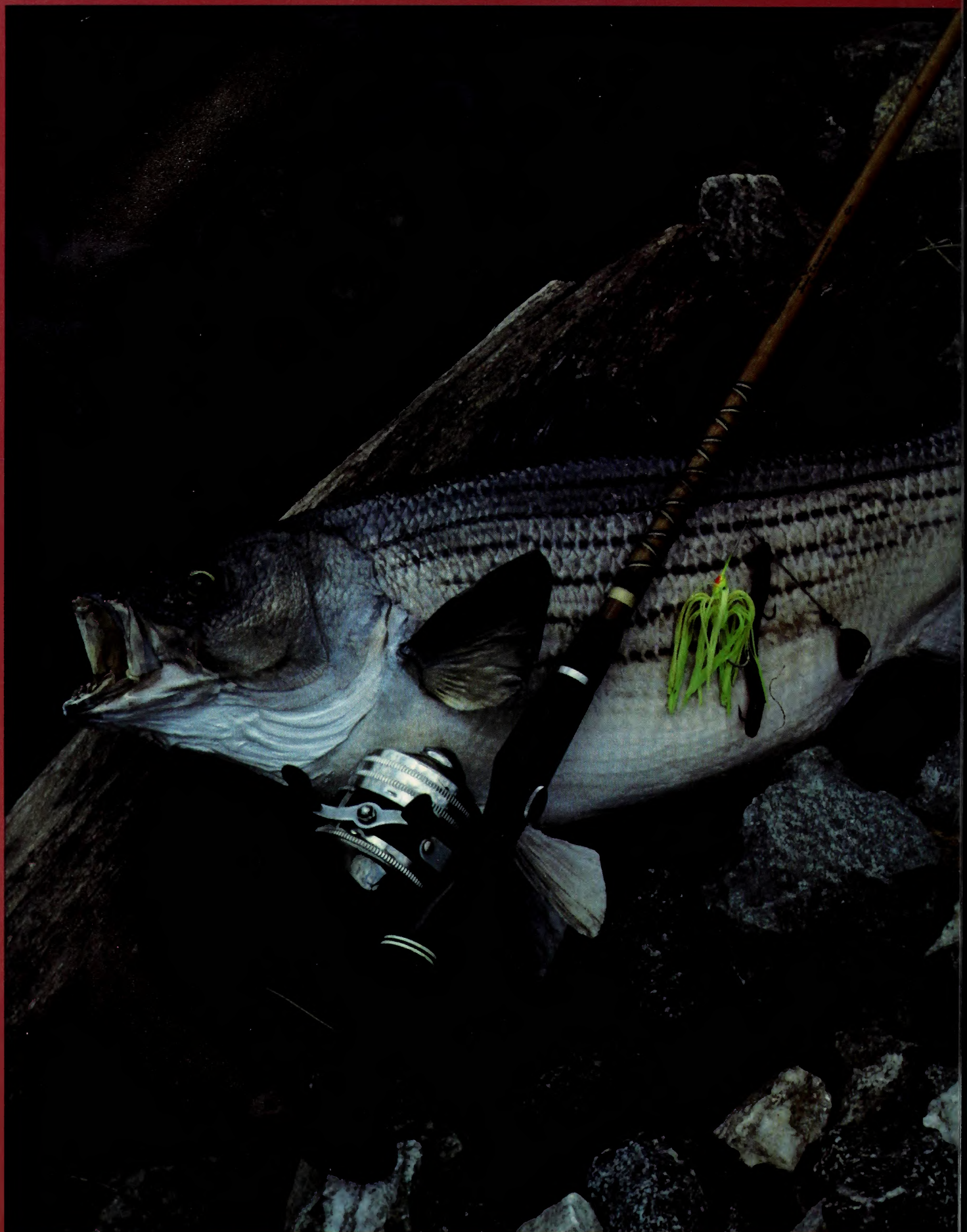


4. *In the center of the stump is a very dark circle made from old water-bearing tubes that have filled with resin and gum. This tough wood is called heartwood. Surrounding the heartwood is lighter-colored wood, called sapwood, that still carries water.*

3

2. *Water rises in the tree trunk through hollow cells that form tubes no thicker than a thread. These tubes connect the roots with leaves, buds and twigs.*

3. *The tree adds girth each year by making new water-bearing cells and tubes. A record of this cell growth can be found in the annual rings on a tree stump. Larger cells are created in the spring to help the leaves get lots of water. Smaller tubes are created in the fall when tree growth slows down. The contrast between the large and small cells creates distinct divisions. Counting rings can tell us how old the tree is.*



Here Come The HYBRIDS

The striper-white bass hybrid has a big future in North Carolina's smaller lakes.

written and photographed by Jay Davies

When Mike Redmon borrowed a rod and reel from a friend to fish a small, 300-acre lake not 30 minutes from his home, he never dreamed he would land a world record. Mike lives in Walkertown just outside of Winston-Salem and is a dedicated largemouth bass angler. He usually travels several hours to pursue his sport, but when his nephew invited him to fish Lake Higgins north of Greensboro, Mike thought he would give this backyard lake a try.

Mike was bumping the bottom with one of his proven bass lures when it happened. "My rod tip dove for the water and never left it," said Mike. The fish fought deep, alternating strong running surges with quick dashes. One moment the fish was on the right side of the boat and the next it dived underneath to the other side. Several times it wrapped the line around the motor.

"I didn't know what I had on, but I knew it was big," said Mike. A couple of minutes into the battle Mike caught a glimpse of the fish as it flashed on its side a foot or so beneath the surface. The striped, silver pattern told him it was no largemouth.

Mike fought the fish for another few minutes as it pulled the small boat around the lake. Finally he got it alongside, and having slipped his fingers through the gills, was just lifting it from the water when the fish gave a mighty flip. Mike froze and watched in horror as the huge fish splashed back into the lake. "I thought I'd lost him. He was so big, I just couldn't believe it," said Mike. Luckily the fish was solidly hooked and a minute or so later Mike was able to boat the biggest hybrid ever caught in North Carolina.

It was then that fishermen all around the lake turned their heads as a loud war whoop echoed across the waters. Redmon was pretty excited, "I just started hollering . . . that fish fought harder than any largemouth."

Mike had good reason to be jubilant. The fish weighed 11 pounds, 11 ounces, which qualified it as a world record hybrid

Mike Redmon had his record 11 pound, 11-ounce hybrid mounted, and it is shown here with the lure and rod and reel he used to catch it.

bass for the 8-pound test line category and the all-tackle North Carolina State record.

In case you are wondering, a hybrid bass is a cross between a striped bass and white bass. These fish look very much like striped bass in coloration, except the horizontal black lines characteristic of stripers are irregular and broken near the tail. Hybrids acquire the fast growing and larger overall size of striped bass but maintain the chunkiness of white bass.

The first hybridization between the species was performed in 1965 using striped bass eggs and sperm from a male white bass. Biologists refer to this cross as the original hybrid. Later experiments using sperm from striped bass and eggs from white bass produced a fish called the reciprocal hybrid. By the late 1960s several southeastern states were evaluating the potential of original and reciprocal hybrids to produce a fishery initially in large reservoirs. These early studies showed both fish grew much faster than either parent species, primarily preyed on shad and offered excellent sporting qualities.

During this period of early experimentation, the North Carolina Wildlife Resources Commission was investigating ways to enhance its small lakes management program. These lakes, which are primarily Piedmont city water supply reservoirs under 1,000 acres, were managed for largemouth bass, bream, crappie and catfish. These species generally use the habitat close to shore, however, and the open, mid-water area of the reservoirs was not being used to produce a fishery.

Hybrid bass appeared able to fill this niche, but they had never been evaluated in reservoirs less than 1,000 acres in size and several questions arose. Would they be able to produce a sport fishery in the small city lakes? How would they affect the existing sport fisheries for largemouth bass and other species? What would they eat? Which hybrid would be best?

In the early 1970s the Wildlife Commission began a study to find the answers to these questions. Using electrofishing equipment, Commission fishery biologists collected striped bass from the Dan River in Caswell County and white bass from the Catawba and Uwharrie Rivers in McDowell and Montgomery Counties. These broodfish were transported to the Commission hatchery in Fayetteville where both the original and reciprocal crosses were performed.

Male broodfish were ripe and presented no problem in the collection of their sperm. The females, however, had to be injected with human chorionic gonadotropin hormone to promote ovulation. Once the eggs had ripened, they were stripped from the females and mixed with sperm from male fish. The hybrid eggs soon hatched and the larvae were placed in rearing ponds where they were fed brine shrimp and zooplankton. After 30 to 40 days, the hybrid fingerlings were stocked into the study lakes.

For the next five years the fish, their place in the lake ecosystem and the response of anglers were studied. The results were revealing. The original hybrids by far outperformed the reciprocal cross. In fact, the reciprocal crosses were not successful in any of the lakes in which they were stocked. No one knows why.

"The hybrids we use grow up to 8 or 10 inches the first year," said Roger Jones, a Commission fishery biologist, "and they feed primarily on threadfin shad which the Wildlife Commission stocks regularly." Since the hybrid inhabits the open, mid-water area of the reservoirs, it does not compete with other gamefish such as largemouth bass, crappie and catfish. Best of all, hybrids are a feisty, aggressive gamefish, and have already gained favor with many Tar Heel anglers.

Joe Morgan, a warden on Lake Higgins for the City of Greensboro, is a great fan of the hybrids. "They'll hit anything, from the most sophisticated bass lures to bait. A lot of them have even been caught on chicken liver while bottom fishing." The most appealing thing about the fish is that it doesn't take an expert to catch them, and they put up a good fight.

The hybrid program is not a bed of roses, however. Because the fish are sterile, they can not reproduce their own kind naturally. Consequently, to maintain the fishery, the Wildlife Commission has to restock periodically — a costly proposition. Also, obtaining brood fish is not easy since the adult white bass and striped bass have to be collected during their spawning runs, and these runs are difficult to predict. Climatic conditions such as weather fronts and the amount of rainfall cause the time of spawning runs to fluctuate. Water pollution, especially siltation, also has a considerable effect on the spawning runs.

Another perplexing problem is that hybrid fingerlings have a tendency to migrate downstream, even over dams. Consequently, the number of hybrids in a reservoir is not entirely dependent on the number stocked. This makes it very difficult to produce a quality fishery.

A subtle, but potentially devastating problem, caused by this migration tendency, is that hybrids enter the river and mix with wild populations of white and striped bass. Even though the hybrids cannot reproduce with themselves, they can breed with their parent species. Should such matings occur, the genetic makeup of the native striped bass and white bass populations could be adversely affected. To prevent this, the Wildlife Commission plans to confine the hybrids to reservoirs far removed from major striped and white bass spawning areas. Hybrids are presently in Oak Hollow Reservoir near High Point, the Old High Point City Lake, lakes Brandt, Townsend and Higgins near Greensboro, Wadesboro City Lake, and Tar River Reservoir near Rocky Mount.

Fishery Biologist Roger Jones has been involved with the hybrid bass program since its inception. He feels the fishery is just starting to come into its own. "As anglers learn about the hybrids and how to fish for them, I feel their popularity will continue to increase," he said. Pound for pound, the hybrids are one of the sportiest freshwater fishes in North Carolina and Jones expects Tar Heel hybrids will approach the current world record of 22 pounds within a few years.

Early spring, especially April, is the best time to catch hybrids, particularly the larger ones. Fishing on the bottom with chicken livers or casting to schooling hybrids on the surface with Rebel or Rapala lures are two productive methods; however, many fish are caught by anglers fishing for other species. You should use at least 8-pound test line and 10-pound test may be better. A small boat is handy, but not necessary as most lakes have fishing piers. Hybrid fishing can be sporadic, yet anglers say when they're hitting, the action is likely to be frantic.

Because of the hybrid's rapid growth, fishing regulations are liberal. In most hybrid lakes in the Piedmont there is no daily creel limit or minimum size limit. There are some exceptions, however, and anglers are advised to check the *1983-1984 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* or ask a local wildlife enforcement officer.

The hybrid program is undoubtedly one of the most successful fishery programs "spawned" by the Wildlife Commission in recent years and state records are expected to be broken regularly. And as capabilities improve, other lakes that prove suitable for these fish may also be stocked with them. Indeed, the future for hybrids looks bright, especially in smaller lakes, and it may be only a matter of time before these exciting gamefish become one of North Carolina's most desirable species. If you have any doubts, ask Mike Redmon. ☒

PORTSMOUTH YESTERDAY & TODAY

Time seems to stand still on this barrier island, yet Portsmouth was once a thriving place. Today, few except fishermen and beachcombers visit.

written and photographed
by Joel Arrington

A fishing trip to Portsmouth is a journey into the past. Abandoned houses in the crumbling village evoke a feeling of desolation, and on the great north beach tidal flat, where land and sky and ocean melt together, time seems to stand still. On visits there I sometimes feel that I have been somehow transported to a period long ago. It could just as well be the 1940s or 1850, depending on whether I am on the beach, which is ever changing yet always the same, or in the village, which on a lazy afternoon with mosquitos buzzing in my ear, could be frozen in time on a day from my childhood.

When I first went to Portsmouth Island, it was as isolated and remote a fishing spot as you could find on the coast, and we pretty much had it to ourselves. Then, as now, no bridges spanned the inlet and sound which separate it from the mainland, and extensive shoals discouraged all but the most determined visitors in boats. A private ferry took a few ardent fishermen and their gear to the southern end just north of Drum Inlet, and we drove the 20 miles up the beach to Ocracoke Inlet and the little village of Portsmouth, occupied then by its last remaining residents. A handful of anglers came in boats, and a few private pilots landed on the beach with rods strapped to their struts. That was before this section and the rest of Core Banks south of Drum Inlet down to Cape Lookout were purchased for the Cape Lookout National Seashore, before the village was abandoned by permanent residents.

And it was before word got out about Portsmouth — its fishing, shelling and camping, its ghostly visage and fading culture. Generally, it still is not crowded on the island, but nowadays, during the peak fishing months of May and November, you will lose your claim to a good beach slough if you leave it, day or night. You will not enjoy the beach alone for days at a time as we used to in the sixties, but it is still a prime surf-fishing spot and, unlike the upper Outer Banks, it is still difficult to reach, a distant place altogether different in mood.

All the inshore species of the mid-Atlantic frequent Portsmouth's beach sloughs in season. There are the small bottom fish — sea mullet, spot and croaker — and there are flounder, false albacore, bluefish. In spring and fall, jumbo blues sometimes blitz the beaches and anglers go home freighted with fish. Speckled and gray trout have been commonplace, although not so many these last few seasons.

But most of all, Portsmouth is a place for red drum. The small ones called puppy drum are often plentiful in spring and fall; there are the mid-sized ones called

Portsmouth Island, and especially the abandoned village, is a place where time seems to stand still. The old docks, marshes and cottages are quiet, devoid of life, as though the inhabitants had just stepped out for a moment. A visitor reads the headstones in the cemetery (below) and finds a record of life and death going back over 200 years.

yearlings; and there are trophies of 40 pounds and more. It is for these giants of the species that many of the surf fishing cognoscenti come to Portsmouth in spring and fall. At times, sloughs at the north end of the island have been extraordinarily productive for big channel bass, as these fish are also called.

But fishing at Portsmouth, like drum fishing everywhere, is a sometime thing. You do a lot more fishing than catching, and a handful of veterans and experts catch most of the fish. Nearly always the action comes after dark. Drum seem to have an aversion to waters close to shore during the day. Boaters sometimes do quite well sight casting just off the beach while shorebound anglers watch helplessly. Then, as night falls, someone down the strand gets a hookup, then another fish is on nearby, and now your line moves off and you take up slack and drive the 7/0 hook home.

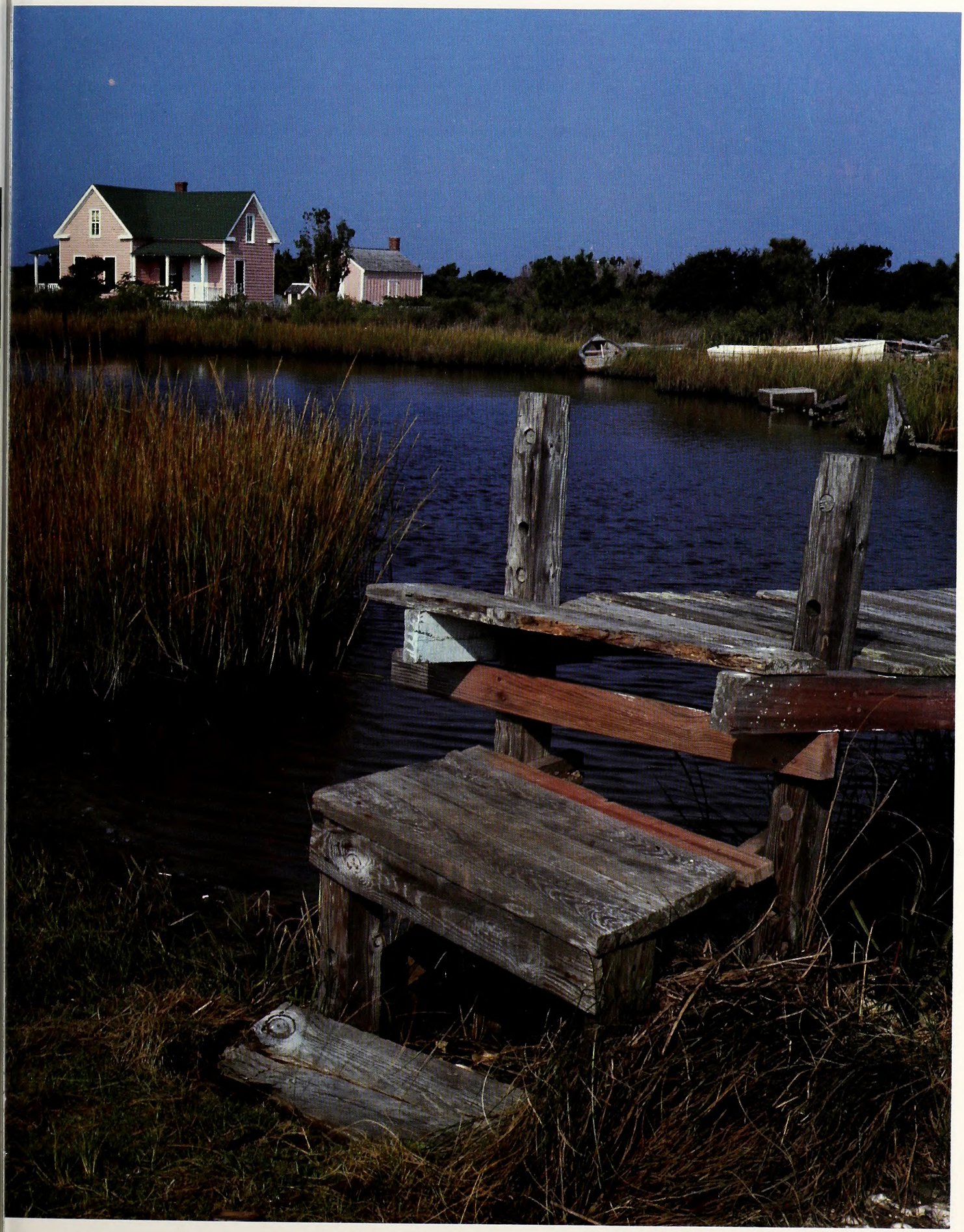
While long-casting experts catch most of the fish, it is possible for the novice to luck into one, and it happens regularly. As a general rule, you have to cast 6 or more ounces of lead and a big piece of cut bait 80 to 100 yards into wind to the edge of a bar where big drum are likely to be feeding. Only a few strong and skilled anglers can do it, and they can place the bait ideally only part of the time. But weak casters are always catching fish just behind the curl of the last wave breaking on the beach, much to the dismay of experts.

Most fail out of discouragement. It can be argued that the most important characteristic of successful drum fishing is persistence. Eager beginners are likely to start early and fish hard through the middle of the day, which is the worst time, then poop out about sundown, when they should be just beginning.

The tide plays a big part. Experts like high and low water, but not levels between. The top of the tide, particularly when it occurs after sundown, is often best.

Some years there are more good sloughs along the beach than others. Ideally there will be only a limited number of good holes when you arrive. Then fish are likely to concentrate in them rather than disperse along many miles of beach.

Some of the best water is near the high dune called Schooner Hill. It looms over an extensive tidal flat near the north end of the island. Some say a sailing ship that wrecked on the beach is buried inside. I once flew from Beaufort with the late Charlie Vellines to land in his small plane on the grass strip there and to fish the surf from his tractor-pulled fishing trailer. That day the wooden beams of an old ship emerged from the sand, and we pried carved briar nails and metal fasteners from the soft wood, some of it partially covered with an asphalt-like mixture of tar and sand. Charlie said it was the first time he had seen that wreck emerging from the beach in 30 years. Long before, storm or currents had revealed it in its grave and he had measured it, described it and sent the



data to the Smithsonian Institution. A researcher wrote that it had to be one of three possible sailing ships that left England one year in the 1800s. A few days later, sand covered it again, and, as far as I know, it is still invisible to the scores of anglers who stand just feet or inches above it on the beach.

As good as the fishing is at Portsmouth, and as much as I enjoy it, the intriguing part of a visit there is not the fishing, but the village and what it conjures up about the past. We would always drive over from the beach and poke around, slapping at mosquitos and gnats and greenheads that inevitably buzzed about, just to see what we could see.

What's left of the town is abandoned now by permanent residents, but the U.S. Park Service leases the houses to people who keep them up, after a fashion, and there are rangers about the station house and radio communication to the mainland in case of emergency. As you stroll through the narrow lanes beside yards trimmed neat as formal gardens and near family plots of fading tombstones ordered, I have read, from Sears Roebuck, you irresistably try to imagine what this place must have been like in its day.

Consider, for example, that once two thirds of all North Carolina's exports passed through Ocracoke Inlet, over 1,400 sailing vessels per year. That was in 1842, and four years later, Congress approved a hospital for Portsmouth's sick seamen. Today you can see the cistern that served it growing up in weeds beside the airstrip, but that is all.

On Shell Castle Island just inside the inlet in Pamlico Sound, there were warehouses, docks and a lighthouse. Later there was a grist mill, a lumber yard, ship's chandlery, porpoise factory, and a tavern. Portsmouth residents fenced their houses against livestock that roamed free, feeding on marsh grasses. An early writer said the cows and sheep produced sweeter meat than any grown on the mainland.

The 1850 population was over 500, including slaves, but mostly pilots and sailors, ship owners and shopkeepers. On a warm summer evening, Portsmouth's taverns must have echoed with shouting sailors while the harbor was crowded with great sailing ships and the air smelled of rum and hemp and tar. Wandering through the silent streets today, you yearn for an interpreter, a source of answers to your questions.

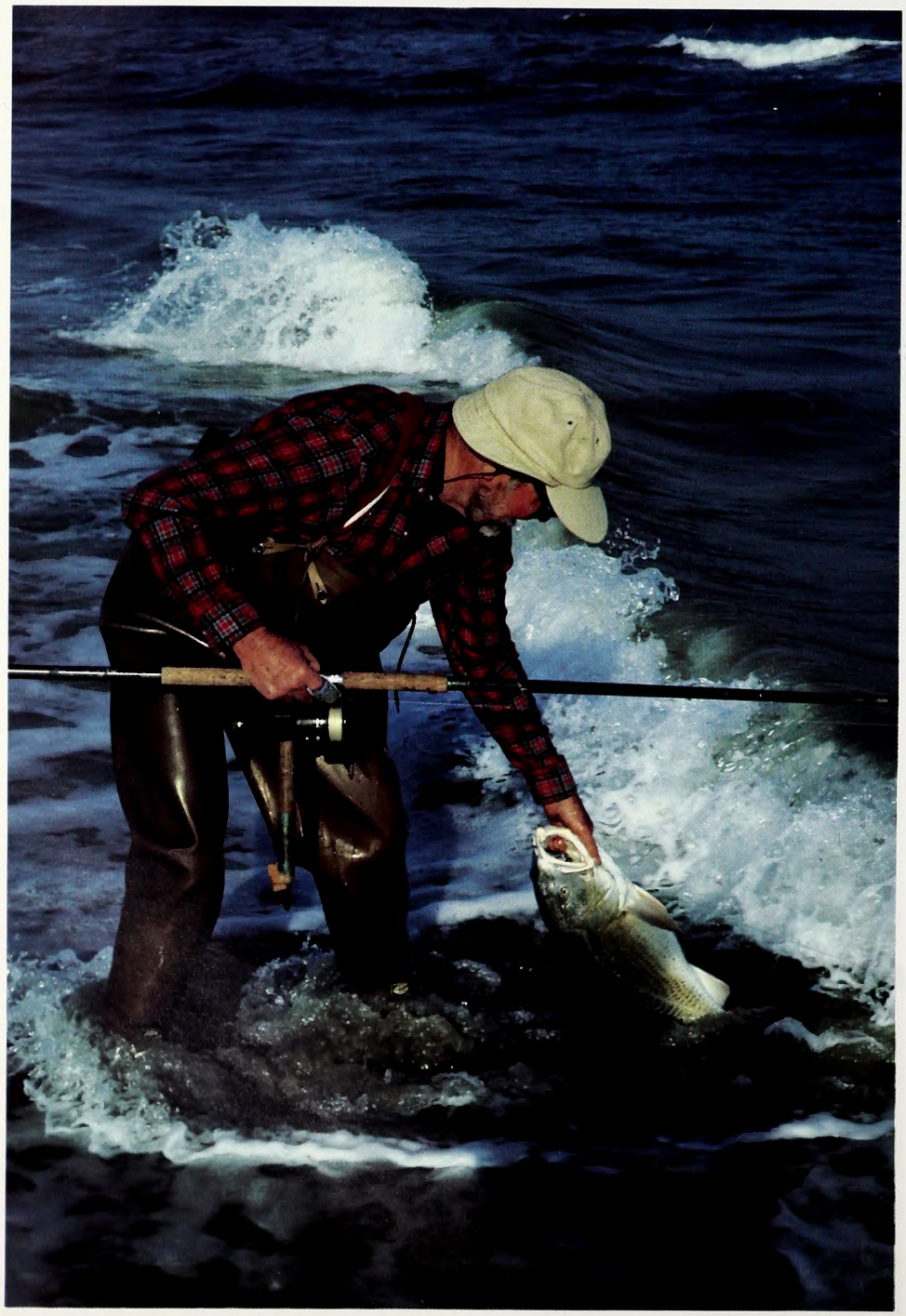
Two hundred years ago, Portsmouth sat at a crucial transportation juncture at a time when sail was king, when Ocracoke Inlet was much bigger and deeper than it is now and when, going north, the next inlet through the Outer Banks was just about where Nags Head now sits. The village was planned, authorized, plotted and named before a single nail was driven, and it seemed to hold promise. Indeed, prosperity was virtually instantaneous, although the first half-acre lots sold for only 20 shillings

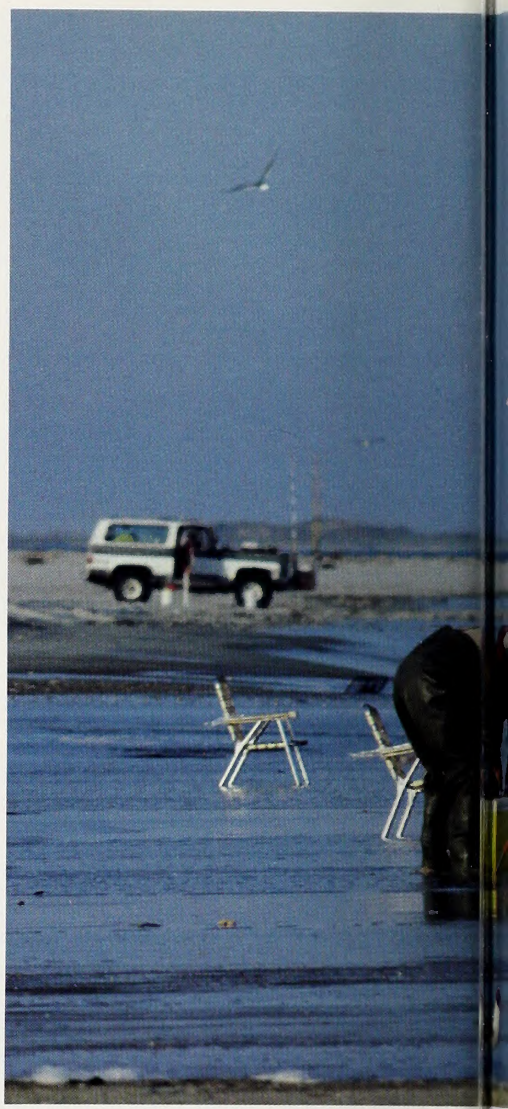
Like the other buildings in the village, the church still stands, and the structures and grounds are kept up under park service leases. Everywhere, there are reminders of an earlier era and picturesque scenes such as this old boat (below). On the ocean side of the island, a solitary angler waits for a bite. Waiting comes easily on Portsmouth.

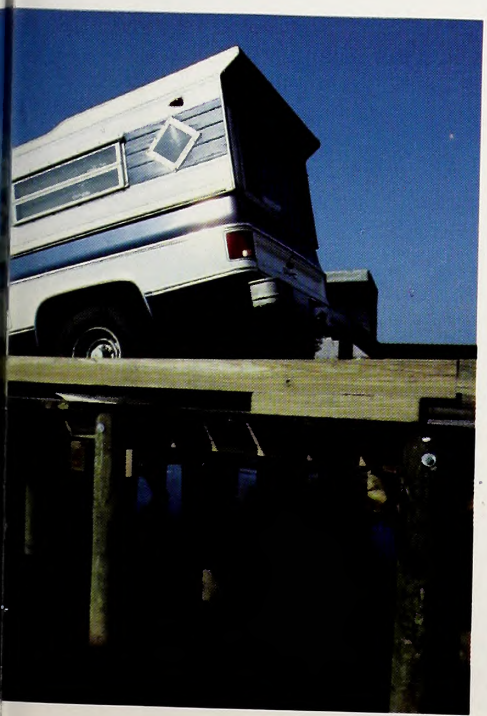
apiece. The base for this prosperity was shipping — in particular, a form of it called lightering. Large ships anchored inside the inlet where there are only shoals now and transferred half or more of their cargoes to shallow-draft vessels. Warehouses on Shell Castle and Portsmouth stored these goods until they could be shipped to New Bern or Bath. To Portsmouth residents, good times probably seemed as though they would go on forever.

Indeed, Portsmouth did not expire suddenly. It was a slow death that began when a hurricane in 1846 opened Hatteras and Oregon inlets, an event which eventually changed shipping patterns on the North Carolina coast. Portsmouth was slowly trapped in an economic back eddy. The warehouses were soon half empty, then bankrupt, and finally the windjammers did not come anymore. A series of storms discouraged remaining residents and soon it was clear to young people that there was no future for them at

Surf fishing for channel bass is often excellent in deep sloughs along the beach at Portsmouth, and anglers take a ferry from Cedar Island (below, right) and drive their vehicles along the sand until they find a likely spot. In the backwash of a wave, an angler (below) lands a nice channel bass.





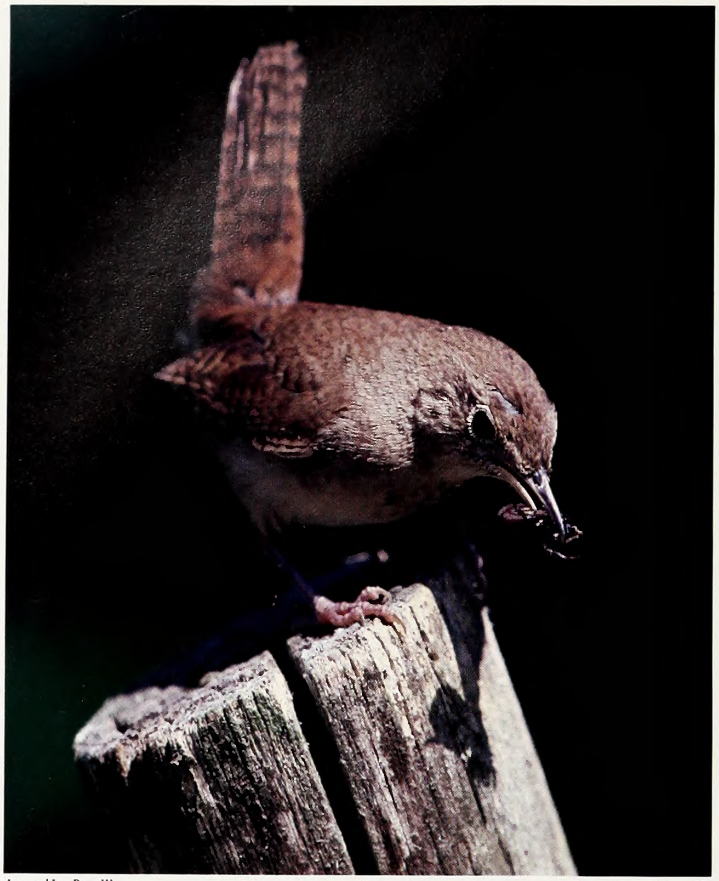


Portsmouth. A few older people hung on guiding hunting and fishing parties, or by commercial fishing and oystering. Tourism bypassed the island because access was too difficult. By 1900, only a few dozen people remained. In 1950, they were down to 14. Henry Pigott, the last remaining male resident, a black man, died in 1971. His grave is in the Dixon family cemetery beside the Methodist church — founded in 1828. Pigott's home, pink against the greening marsh in spring, still stands on Doctor's Creek from which he used to pole out to meet the mailboat from Ocracoke. With his passing, the remaining resident women, Marion Babb and Elma Dixon, moved to the mainland.

What remains of this former boom town created by the Colonial Asssembly in 1753, once the largest town on the Outer Banks? There are 18 houses in varying stages of decay of the 109 that stood in 1850. There is the church, its brick pillars askew from a 1933 hurricane, a few dozen signatures in its log. There is a wildlife sanctuary and the fishing, of course. But mostly there is isolation, diminishing now with increasing visitors, and the electric hum of insects.

Two hundred fifty people came to a homecoming at Portsmouth in 1973. They were former residents, people with old ties to the island and a few curiosity seekers. A woman I met said she had spent many of her childhood summers there years ago and the greatest treat she could imagine was the sliver of ice she was given on the rare occasions when it was brought over by boat.

Portsmouth still is a place of simple pleasures, a place where you can walk the beach, contemplate the sea's long rhythms and feel the full moon pulling on your psyche. It is a place that is always in the past, a place always about to revert in your imagination to a time when the streets were full of sailors from far away or when a sliver of ice on a hot day made an unforgettable memory. ⊠



Leonard Lee Rue, III

Those Winning Wrens

by Rick Estes

Long a favorite of bird watchers, wrens have adapted very well to our rapidly changing world.

"Wrens are small, restless, brownish birds with finely barred, narrow, rounded tails that are often cocked forward."

That description of wrens from a bird identification book is accurate enough, but it leaves a lot unsaid about one of our most interesting bird species. I discovered some of their winning ways when I tried to photograph a pair of house wrens in my backyard.

I had erected a hollow gum bird house on a fence post in hopes of attracting a pair of bluebirds. It did not take long to learn, however, that this choice nesting site had been claimed by a family-minded male wren. He had been proclaiming his intentions enthusiastically to the other birds in the vicinity for several days before I even put up the house.

Although I did not understand the meaning of his energetic singing, the message was not lost on the house-hunting sparrows, chickadees, and other feathered neighbors. "Stay clear! Stay clear! It's mine!"

Since there was considerable competition for territory and nesting sites during this mid-April, and since I had not been successful in attracting any bluebirds, I was relieved to observe that his claim would be honored. Everybody maintained a respectful distance while he went about the business of furnishing his new digs.

If I had known wrens better, I probably would have been less concerned. They are very successful competitors with other birds, and this may well have been the second nest of the season for this particular bird. Male wrens build several nests of twigs, and then go about the business of attracting a mate. She will then inspect his nests, and should she find one to her liking, will usually throw out some of his "furniture" and finish it to her own specifications.

When my busy wren found a mate, I began stalking the two of them with camera in hopes of documenting the whole process to the day when the young birds would leave the nest.

My plans proved unsuccessful from the start. The wrens, with twigs, grass, or feathers in beak, would invariably dart into the house when I had just looked away for a second. Or, they would work their way through the thick bushes behind the house and then wait patiently until I gave up and left.

This went on through all the nest-building and egg-laying stages, and we were well into feeding time before I finally got my chance. I was standing near the house when one of the wrens zipped into the entrance with a juicy caterpillar for the babies. I moved quickly into place directly in front of the log house. With camera and zoom lens focused and ready, I waited confidently.

After several minutes of waiting for the bird to emerge, while my sense of triumph slipped noticeably, the wren popped out with a large, round ball of excrement in her beak. She had been cleaning up after her brood, and she neatly presented the results to my 200mm lens!

I gave up. The wrens had won.

Winning is a characteristic quality of wrens, not only in habit,

The house wren (above) and the Carolina wren (facing page) are two of the six wrens that reside in North Carolina during the year. The others are Bewick's wren, the long-billed and short-billed wrens, and the winter wren. Ten wren species inhabit the United States.

N.C. Wildlife Resources Commission

Rick Estes

Tousled Carolina wren young (top) wait for food from parents. The Carolina wren is the largest wren species on the East Coast and is found year-round in North Carolina. Wrens nest just about anywhere, but they prefer thick bushes close to the ground. Wrens raise two broods a year, but not with the same mate. The female house wren may start a new nest with a different male while her first mate finishes raising the earlier young. A wren house (above) is easy to construct.

but in appearance as well. While they may be described as small, brown birds, they do have attractive markings. The Carolina wren, the largest in the East, is identified by a broad white eye stripe that extends from the beak all the way to the base of the neck, and by its rufous (reddish-brown) back and buff-colored belly. The smaller, more plainly marked house wren makes up for its relative lack of color with an abundance of energy and ingenuity.

To say that the house wren, and to some extent, the other wrens have adapted to man's changed environment and are coping is an understatement. Even though some species of wildlife have suffered because of increasing urbanization and invasion of their habitat by man, the house wren has actually extended its range in North Carolina since the 1920s and has moved southeastward into Georgia. In many cases, these birds prefer suburban areas with lots of shrubbery to the open woods.

House wrens will build their nests just about anywhere. Writing in *Birds of the South,* Charlotte Hilton Green says the house wren is "truly indifferent about where and how it builds its nest. It has been known to choose a site . . . in banks of cuts and streams; in holes of trees or stumps; in nooks and crevices about buildings; among tangled roots of upturned trees; and under brushpiles. Wren families have been raised in the pockets of old coats, in old cups, broken gourds, discarded basins — and one year we found a family getting along nicely in a half-emptied box of alabastine on a shelf in the garage."

People have returned the wrens' apparent friendliness by electing two as state birds (the Carolina wren in South Carolina and the Cactus wren in Arizona). Great Britain even printed a coin with the image of a wren on it. Everything a nest-building wren does has some purpose. Male wrens often roost in a cock nest in order to trick cowbirds into laying their eggs in that nest rather than the real wren nest. Even so, cowbirds sometimes move in and take over the real wren nest when it is completed,

Steve Maslowski

Leonard Lee Rue, III

The winter wren (left) migrates north to breed and returns in the spring. It is a tiny bird, smaller than a house wren (right), that keeps to bushes and thickets and rarely flies. The house wren prefers suburban areas to the open woods. Unlike some bird species that sing only until the nest is completed, the house wren sings throughout the courtship and nesting stages.

and force the smaller birds to evacuate and start all over again. Wrens normally raise two broods each year, and may change mates before starting the second family. Sometimes, in their zest for the job at hand, the second brood will be started before the first is able to fend for itself, and these young birds will perish. Understandably, the breeding season is a very busy one for wrens. Although the male seldom incubates the four to nine eggs, both parents feed the young, and the male will feed the female while she sits on the nest.

Wrens are among our very few songbirds that sing both day and night. The Carolina wren can even be heard piping out its cheerful, bubbling song when a heavy snow covers the ground. Some birders have called the house wren the "mocking wren" because of the great variety of its songs.

Wrens feed almost exclusively on insects, and they go after bugs the same way they do everything — full-speed ahead. Studies have shown that 94 percent of the diet of some wrens consists of insects. While there is no proof that wrens can protect a garden from insect damage, their voracious appetite and their preference for human environs make them ideal neighbors for our gardens and flower beds. Since they feed primarily near the ground, wrens are especially attracted to residential areas with lots of hedges, brushy areas, and some wood-field edges. They are particularly fond of a tangle of raspberry, blackberry, and elderberry bushes. These plants grow thick and close to the ground — ideal hiding and nesting places for wrens. Also the fruit of these shrubs will attract the insects wrens eat and fruit-eating birds you'll enjoy watching. Small houses placed near such a thicket are almost sure to attract house-hunting wrens.

At any given time of the year, one or more species of wren can be found somewhere in North Carolina. The Carolina wren lives here year round, and is found throughout the Southeast. House wrens migrate, but their summer and winter ranges and migration routes overlap so that these birds are usually here somewhere.

Bewick's wren is larger than the house wren and is all white underneath. It has a prominent white eye stripe like the Carolina, but is slightly smaller and has a white-edged tail. It is a summer resident in our mountains, and may be seen rarely in other parts of the State during winter.

The long-billed and short-billed marsh wrens are seen here almost exclusively as migrants, although some do winter in our coastal marshes. Both these birds have short, white stripes running from the back of the neck and head part way down the back.

Our only other wren is the winter wren. It is the smallest of the six species that occur here. The winter wren's tail is extremely short, averaging just over one inch in length, and is usually held straight up. This bird lives in our higher mountains and is not frequently seen.

The four other North American wrens are residents of the western United States and the arid Southwest. One of these, the cactus wren, is the largest of all American wrens, averaging over 6 inches in length. By comparison, the Carolina wren is about 2 inches shorter.

In terms of evolution, the wren family appeared during the Tertiary period of geologic history (65 million to 1.8 million years ago) when North America and South America were separated by water. Also developing during this time were turkeys, thrashers and mocking birds, among others. The wrens' family name, Troglodytidae, means "cave-dweller," and comes from the cave-like, domed nest they usually build.

Much like our own cave-dwelling ancestors, wrens have adapted to change, and their future looks pretty bright. In fact, wrens have not only survived a rapidly changing habitat, but even seem to prefer the changes. ⊠

Meet Norm L. Hunter

Ol' Norm is a statistical composite of North Carolina's hunters, and he's helping biologists manage our big-game populations.

by Mark Taylor

Early last spring, readers of *Wildlife In North Carolina* were introduced to Norm L. Angler, a statistical composite of the State's fishermen drawn from an angler-opinion survey conducted through the mail. Norm is an affable chap who taught us much about his fishing preferences and opinions. One question haunted us, however. What did Norm do when he wasn't fishing?

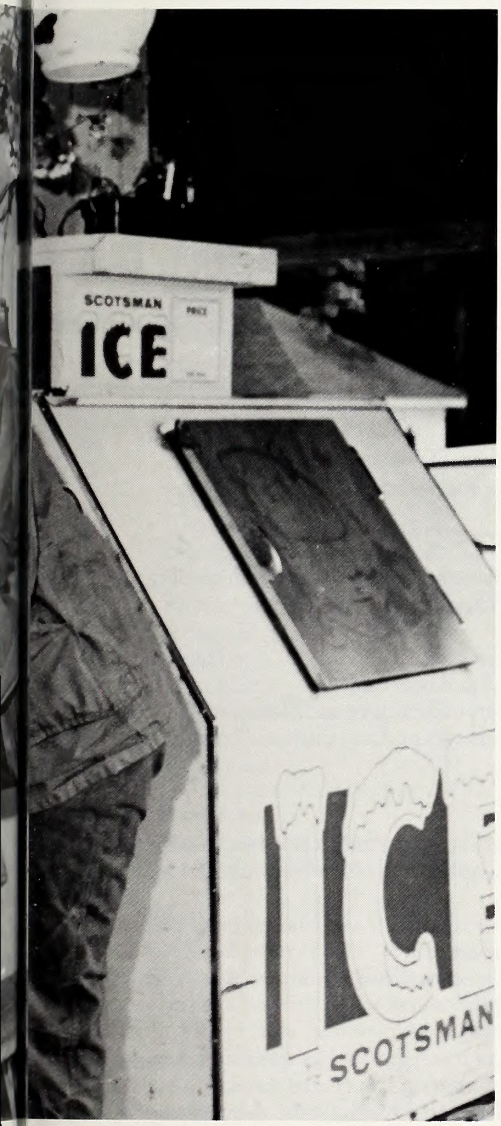
We decided to give Norm a call to find out. He wasn't in, but his wife answered. In fact, she told us in an irritated tone that Norm is rarely in. During the summer, he's fishing. In the fall he's deer hunting, and in the spring his thoughts turn to turkey hunting. You can catch him home every third Wednesday in February, though. Then, her voice softened. "He goes through this personality change every fall — insists that his last name is Hunter instead of Angler. It worries me. Do you think he's all right?" We told her this seasonal mental disorder was very common in North Carolina, and afflicted about 203,000 people who shed their normal identities every fall for the role of big-game hunter. The disorder passes in time causing little damage but much domestic discord.

A few days later, Carl Betsill and I set out in search of Norm. In addition to serving as small-game project leader for the Wildlife Commission's Division of Wildlife Management, Carl oversees all of the Division's mail surveys. Probably no one is more familiar with Norm's habits and haunts than Carl, and sure enough we soon ran into blaze-orange bedecked Norm sitting on the front porch of a country store not far from Lizzard Lick. As always, Norm was cordial and over a can of Vienna sausages we chatted at some length about the world in general and North Carolina big-game hunting in particular. When the heat of the day had passed, Norm said he had to be going — he wanted to be firmly ensconced in his tree stand before the deer began moving in late afternoon. We wished him the best of luck, and on the drive back to Raleigh Carl told me some interesting things about Norm's likes, dislikes and family background.

"Norm L. Hunter represents about 3,109 big-game hunters we contacted through the mail last winter with our big-game mail survey," said Carl. "Our survey was drawn from a random sample taken from our license files, and it sampled approximately 1.7 percent of the big-game hunters in North Carolina. The information that we gained from this survey reflects a broad cross-section of hunters, and offers valuable insights and information. This information can be used in establishing regulations and designing management programs that meet the needs and desires of the general public."

The survey found that deer hunting was by far the most popular form of big-game hunting in North Carolina. In fact, 91 percent of the hunters surveyed had hunted deer in North Carolina in 1982. This was followed by 13 percent who hunted wild turkey, 6 percent who hunted bear, and two percent who hunted wild boar. Eight percent of those sampled had not hunted big game in 1982 although they held big-game or sportsman's licenses.

"The popularity of deer hunting no doubt reflects the restoration and



Luther Partin

expansion of deer herds throughout the State," said Scott Osborne, deer project leader for the Division of Wildlife Management. "Thirty years ago, deer were found in only a few parts of the State. Today, deer are found in every county in North Carolina. Although some counties are known for excellent deer hunting and draw hunters from a considerable distance, the widespread availability of deer hunting close to home has caused the sport to boom in popularity."

Most deer hunters prefer still hunting — 66 percent said this was their favorite method of hunting deer. Hunting deer with dogs was favored by 29 percent, and four percent favored stalking deer. The rifle was the firearm of choice, being used by 79 percent of those surveyed. Shotguns were the number two choice at 62 percent, 44 percent of those surveyed hunted deer with bows and 24 percent with muzzle-loaders.

"We were surprised at the numbers of hunters who hunt deer with bows and muzzle-loaders," said Osborne. "We knew these sports were popular, but we had no idea that a quarter of the hunters in the State hunted deer with muzzle-loaders or a third of them with bows."

The survey also showed that most hunters are satisfied with existing regulations and management programs. For example, 80 percent said that when the Wildlife Commission proposes and justifies a doe season in an area, in principal they agree with having the season. When questioned about the 1982 doe seasons in the counties they hunted, 74 to 77 percent of those surveyed — depending on the length of the season — felt that the length of the doe seasons were adequate or even too conservative. Across the board, only about 14 percent felt that doe seasons were too liberal, and the remainder had no opinion.

"These results show that the public, by and large, is satisfied with our doe seasons," said Osborne. "This contrasts, to some extent, with the input we receive at some of our public hearings. However, one weakness with public hearings is that you often hear only from individuals who feel strongly about a proposal. Those who are satisfied with existing programs often stay home."

One change that many hunters would like to see is the issuance of one or more either-sex deer tags that could be used anytime during the regular deer season in either-sex areas instead of the current system which allows tags to be used only during special either-sex deer seasons. This was favored by 61 percent of the hunters, opposed by 24 percent, while 15 percent had no opinion.

Turkey hunting is also dear to Norm's heart. The survey showed that most turkey hunters favor calling turkeys (62 percent), while 45 percent favor still hunting without a call and 20 percent favor stalking without a call. A hefty share of the State's wild turkeys are also hunted on game lands. In fact, 38 percent of those surveyed had hunted wild turkeys on game lands, and the most popular game lands were Pisgah, Caswell and Nantahala.

"Game lands are very important to wild turkeys in North Carolina, and will be even more important in the future," said Grady Barnes, section manager for research and regulations for the Division of Wildlife Management. "Wild turkeys need fairly large blocks of forested habitat for survival, and public lands offer the best potential for expansion and restoration of wild turkey populations. This is especially true in the fast-growing Piedmont and Coastal Plain. As wild turkey populations continue to expand and turkey hunting grows in popularity, careful management of turkey populations on game lands will be essential."

Norm had mixed feelings about several questions on turkey hunting. Asked whether the use of decoys should be prohibited for turkey hunting in the State, 40 percent felt that their use should be outlawed while 44 percent felt the practice should continue to be legal and 16 percent had no opinion. Twenty-five percent of those surveyed felt that handguns should be legal for hunting wild turkeys (big-game species, except wild turkey, may now be taken legally with handguns in North Carolina).

Norm had mixed feelings about the use of blaze orange. While no one questioned its value, opinion on whether blaze orange should be mandatory for big-game hunting — especially deer — is split squarely down the middle. Fifty percent of the hunters surveyed favored a blaze-orange regulation for deer hunting. Of this total, 34 percent felt it should be worn at all times, and 16 percent felt it should be required only when walking to and from a deer stand. Forty-seven percent of the deer hunters felt the use of blaze orange should continue to be voluntary (the Wildlife Commission strongly urges big-game hunters to wear blaze orange, but doesn't require it), and three percent had no opinion.

Turkey hunters also had mixed feelings about mandatory use of blaze orange during the spring gobbler season. Fifty-five percent felt it should continue to be voluntary, 19 percent felt that all hunters should be required to wear it while turkey hunting, 17 percent felt that turkey hunters should be required to wear it only while walking, and four percent felt that hunters should be required to display blaze orange within the immediate vicinity of their blinds.

What does the future hold for Norm L. Hunter? "We'll probably check back with Norm by conducting another big-game survey when issues arise," said Osborne. "We might also give him a call one of these days to see how his small-game hunting went," added Betsill. "The information that we gain from these surveys about harvest and success rates — in addition to opinions — are a great help in evaluating existing regulations and programs, and designing new ones. Norm is one of the most accurate authorities we've got."

Results Of Big-Game Mail Survey

1. Which of the following species of big game did you hunt in North Carolina during 1982?

   91% Deer 13% Turkey 6% Bear
   2% Boar 8% Did not hunt big game

2. Which of the following best expresses your opinion of the use of blaze orange during spring gobbler season?

   55% Its use should continue to be voluntary.
   19% All hunters should be required to wear it while turkey hunting.
   4% All hunters should be required to display it within the immediate vicinity of their blind.
   17% All hunters should be required to wear it, but only while walking.
   6% No Opinion

3. Should the use of decoys be prohibited for turkey hunting in North Carolina?

   40% Yes 44% No 16% No Opinion

4. Should shot sizes be limited to No. 4 or smaller when turkey hunting with a shotgun?

   48% Yes 38% No 14% No Opinion

5. Which of the following weapons do you feel should be legal for turkey hunting?

   99% Shotgun 43% Rifle 55% Bow
   46% Muzzle Loader 25% Handgun

6. Which of the following hunting techniques do you use to hunt turkey?

   62% Calling
   20% Stalking (without call)
   45% Still hunting (without call)
   5% Some other technique

7. On which of the following game lands did you hunt turkey in 1982?

   33% Hunted on Game Lands
   62% Did not hunt on Game Lands

   Of those people who hunted on game lands:
   34% hunted on Pisgah
   26% hunted on Caswell
   19% hunted on Nantahala
   10% hunted on Croatan
   9% hunted on South Mountains
   8% hunted on Thurmond Chatham
   28% hunted on some other game land

8. Which of the following methods of deer hunting do you most prefer?

   4% Stalking
   66% Still hunting
   29% Dog hunting
   1% Man drive

9. Which of the following weapons do you hunt deer with?

   62% Shotgun 79% Rifle
   24% Muzzle Loader 33% Bow

10. At present the Wildlife Commission recommends but doesn't require the use of blaze orange. Which of the following best expresses your opinion on the use of blaze orange while deer hunting?

    47% It should remain voluntary.
    34% It should be worn at all times.
    16% It should be required to be worn only while walking to and from a deer stand.
    3% No opinion.

    Summary table:
    50% Want some form of regulation.
    47% Want blaze orange to remain voluntary.
    3% No opinion.

11. If blaze orange regulations were enacted, to which of the following hunters should they apply?

    27% Gun deer hunters only.
    22% Both bow and gun deer hunters.
    24% All fall hunters except dove and duck.
    14% All fall hunters except dove, duck and bow.
    13% No opinion.

    Summary tables:
    I. 41% Want regulations to exclude bow hunters.
    46% Want regulations to include bow hunters.
    13% No opinion.
    II. 49% Want regulations to include hunters of all species. (turkey not considered)
    38% Want regulations to exclude dove and duck hunters.
    13% No opinion.

    note: It should be remembered that this survey sampled only big game hunters and excluded those who hunt small game and waterfowl exclusively. A question of this type would be more meaningful if asked of a sample from the entire hunting population.

12. Which of the following best expresses your opinion concerning the use of bait in deer hunting?

    25% It should continue to remain legal for deer hunting.
    44% It should be made illegal for deer hunting.
    20% Mechanical feeders should be outlawed but other forms of baiting should remain legal.
    12% No opinion.

    Summary table:
    63% Want some form of regulation on baiting.
    25% Want baiting to remain legal in its present context.
    12% No opinion.

13. When the Wildlife Resources Commission proposes and justifies a doe season in an area, do you agree in principle to having the season?

    80% Yes 13% No 7% Not sure

14. In which county do you hunt deer most often?

Rank	County	Rank	County	Rank	County	Rank	County
1	Montgomery	20	Pitt	27	Alamance	36	Perquimans
2	Bladen	20	Henderson	28	McDowell	36	Forsyth
3	Burke	20	Duplin	28	Johnston	36	Clay
4	Anson	20	Buncombe	28	Davie	36	Chowan
5	Wilkes	21	Martin	29	Moore	37	New Hanover
6	Caswell	21	Jones	30	Pamlico	37	Lincoln
7	Halifax	21	Davidson	30	Orange	37	Dare
8*	Pender	22	Stanly	31	Madison	37	Cleveland
9	Haywood	22	Franklin	31	Hertford	38	Mecklenburg
10	Rockingham	23	Yancey	31	Gates	38	Lenoir
10	Brunswick	23	Surry	31	Alleghany	38	Green
11	Craven	23	Durham	32	Wayne	38	Camden
12	Randolph	24	Yadkin	32	Guilford	39	Tyrrell
13	Onslow	24	Transylvania	33	Scotland	39	Lee
14	Cumberland	25	Rutherford	33	Catawba	39	Currituck
15	Northampton	25	Nash	34	Wake	40	Union
15	Columbus	26	Stokes	34	Vance	40	Pasquotank
16	Edgecombe	26	Rowan	34	Robeson	40	Hoke
16	Caldwell	26	Iredell	34	Polk	40	Harnett
16	Beaufort	26	Bertie	34	Mitchell	40	Cherokee
17	Granville	27	Warren	34	Hyde	40	Alexander
18*	Chatham	27	Person	35	Washington	41	Wilson
18	Ashe	27	Macon	35	Sampson	41	Watauga
19	Richmond	27	Carteret	35	Graham	41	Swain
				35	Avery	41	Jackson

Summary statement:
The uneven distribution of hunters is indicated by the fact that 25% of the respondents hunted most often in only the top 8 counties. Fifty percent hunted most often in the top 22 counties. (Respective percentiles indicated by asterisk.)

15. From a biological point of view, it matters little whether the doe harvest occurs early or late in the deer season. Doe seasons in recent years have been set at the beginning of December. Considering these facts, how would you prefer the opening of the doe season to be changed?

50% Stay as it is
24% Open earlier
13% Open later
14% No opinion

16. Which of the following would you prefer?

49% Keeping an uninterrupted doe season as we have now.
35% Changing the doe seasons by splitting them into two or more segments.
16% No opinion.

17. Which of the following best describes your attitude toward the opening dates for the regular buck deer season in the county where you do most of your hunting?

Length of Buck Season

Response	2 weeks	3 weeks	6 weeks	11 weeks
Opens too early	15%	13%	5%	10%
Opens too late	14%	20%	22%	8%
Satisfied as is	69%	66%	71%	82%
No Opinion	1%	3%	2%	0%

18. Which of the following best describes your attitude toward 1982 doe seasons in the county where you do most of your hunting?

Length of Doe Seasons

Response	2 Days	4 Days	7 Days
Too Long	2%	2%	4%
Too Short	36%	34%	28%
Adequate	41%	40%	49%
Omit Season	12%	12%	12%
No Opinion	8%	11%	6%

Length of Doe Seasons

Attitude toward Comm. policy	2 Days	4 Days	7 Days
Adequate or too conservative	77%	74%	77%
Too liberal	14%	14%	16%
No opinion	8%	11%	6%

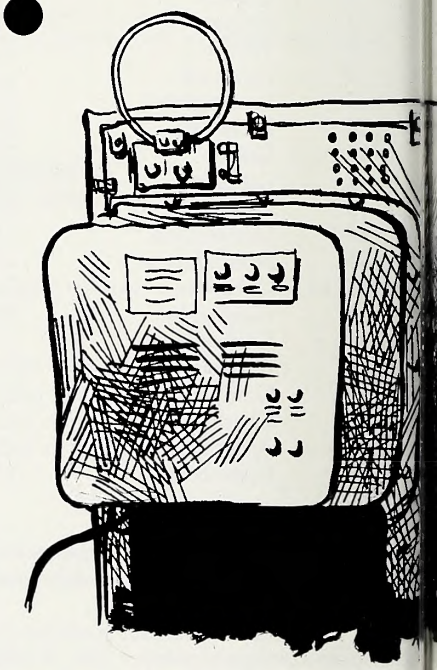
19. Would you be in favor of one or more either-sex tags that could be used anytime during the deer season, instead of the present system in which tags can be used only during either-sex seasons?

61% Yes
24% No
15% No opinion

Because some percentages have been rounded off, not all totals are exactly 100 percent.

There's A Deer In The Den!

It's your house and you don't want to share it with owls in the attic or skunks in the basement. Here's what to do when wildlife species become pests.



illustrations by Lambert Der

by Jane Rohling

"A small but determined band of Buena Vista residents turned their quiet neighborhood into a war zone, as dusk and a flock of 20,000 blackbirds descended together yesterday.

"Cannons boomed, screeching skyrockets cut fiery, smoky tracks across the sky and bombs burst high in the air for an hour as the residents fired the opening barrages in their second annual Battle of the Birds."

Alan Willis, The Sentinel, Nov. 5, 1982, Winston-Salem, N.C.

So, why are all those nice people shooting at all those defenseless little birds? Because 200,000 little birds can become a major headache! They're noisy, smelly, very hard on your landscaping, and they can even be hazardous to your health.

These flocks start out small — usually with a few robins — but once that red-red-robin comes bob-bob-bobbin' along — watch out! As soon as it gets settled in it'll be inviting a few friends over for the winter and before you know it, you'll have an unruly multitude of "blackbirds" — starlings, grackles, red-winged blackbirds, and cowbirds — packed on every available limb. And once they've grown accustomed to their new home, they're not easy to evict. This year was the third year of the Buena Vista Battle of the Birds, and the war has not yet been won.

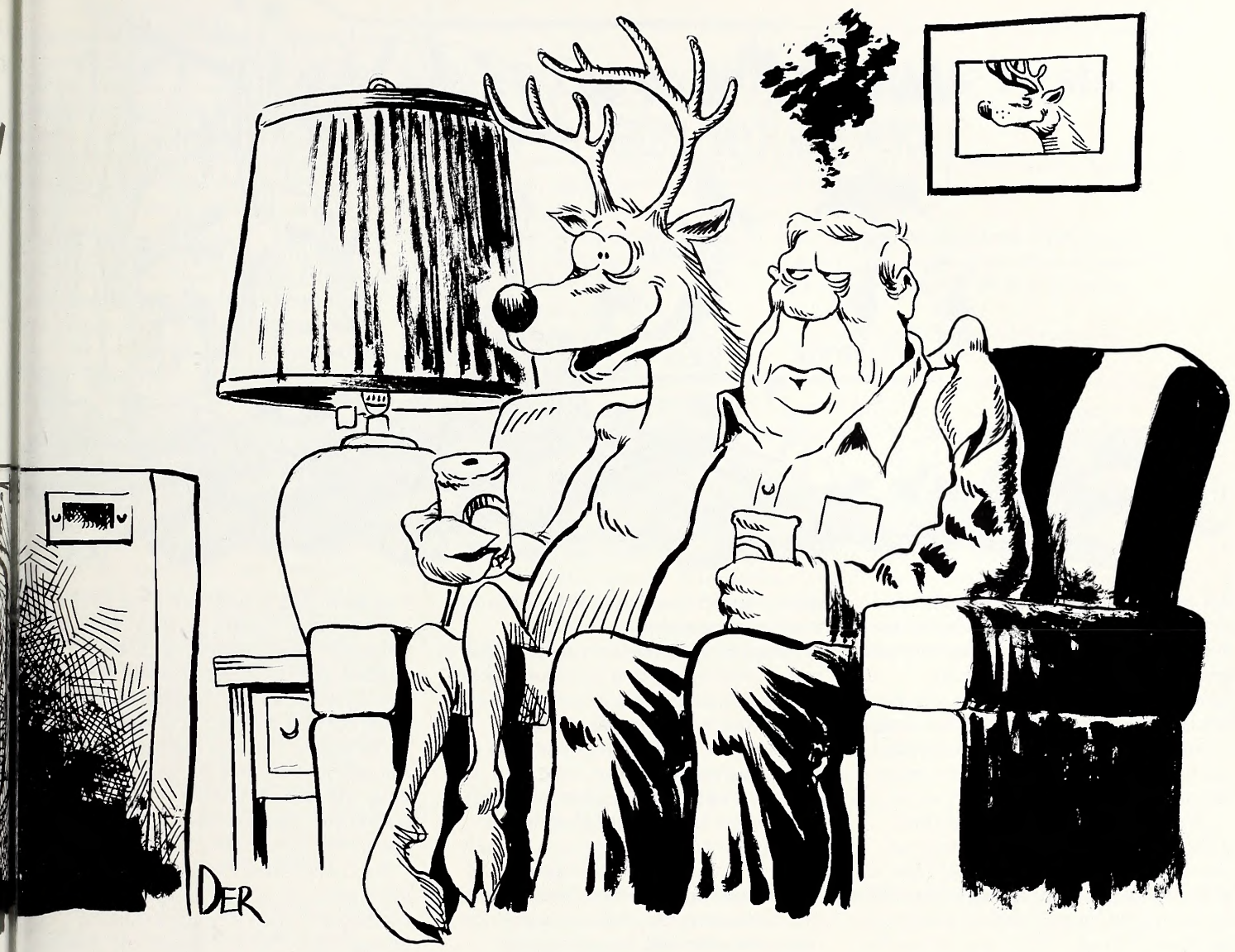
Fortunately, few communities are afflicted with a problem this large, but nearly all of us have had run-ins with wild animals that were in places they shouldn't have been. Of course, the animals — if they could talk — might say people were in places they shouldn't have been, but the conflict still remains, and there are times when many people consider wildlife to be little more than pests.

Of course there are different degrees of pesthood. The urban homeowner with a mole pushing up ridges across a carefully kept lawn has a legitimate gripe, but consider the farmer's plight. Deer may gorge on his corn; snow geese may devour his winter wheat; and beaver may girdle his timber or flood his crops. These are serious economic losses. Deer and beaver take an enormous economic toll each year in lost or damaged crops, and waterfowl are almost as big a problem. In 1982, for example, waterfowl caused an estimated $1,182,000 in crop damages in five eastern counties.

Calculated in economic terms, then, the chief wildlife trouble-makers are deer, beaver, and waterfowl — mostly in rural areas. But in terms of the sheer numbers of complaints, it's the smaller critters — in urban areas — that seem to be the most annoying pests. In 1980, county agricultural extension agents handled over 30,000 wildlife-related calls. The top 10 problem species, were as follows: 1) moles; 2) blackbirds; 3) crows; 4) squirrels; 5) voles; 6) chipmunks; 7) rabbits; 8) deer; 9) snakes; and 10) muskrats. And wildlife specialist Dr. Gary San Julian, of the Agricultural Extension Service at North Carolina State University in Raleigh, says that 70 percent of the calls he received in 1982 pertained to *urban* wildlife.

"These conflicts between people and wildlife are increasing. It's a big problem that we'll have to address somehow," said San Julian.

Many pest complaints are about animals in and around homes. Raccoons, squirrels, skunks, bats and other creatures often discover that our attics, crawl spaces, walls and insulation provide very good denning and roosting sites. Of these species, bats are probably the most frightening to homeowners. One frustrated homeowner called the Wildlife Extension office from his hospital bed, pleading for help in getting rid of bats in his attic. He had been standing on a chair shooting at the bats



when the chair tipped over and he landed in the hospital with a concussion.

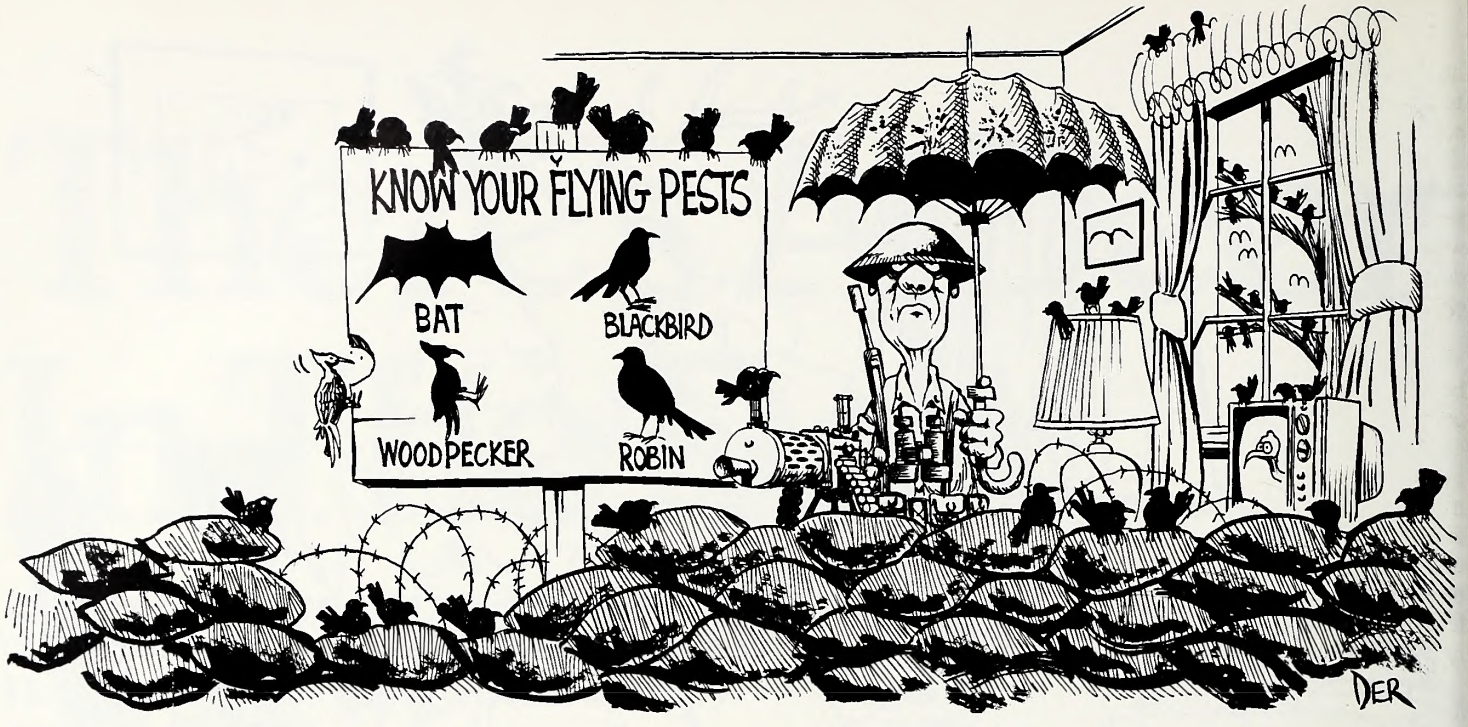
The unpleasant odor of bat urine and feces, the noise bats make entering and leaving the roost, and their potential for carrying diseases make them undesirable housemates, but because they consume up to one quarter of their own weight in insects daily, they are considered beneficial to the environment. They are all protected by federal laws and may not be killed without a permit from the U.S. Fish and Wildlife Service.

If you'd rather not share your home with bats, skunks, raccoons, or other wild trespassers, here are a few general hints to follow. First, determine what kind of unwanted guests you have and where they are entering the house. The next step is to get them out. You can either wait until they leave voluntarily on their daily (or nightly) feeding rounds, or you can encourage their early departure with visual, sound, or chemical repellents. For most of these animals, napthalene flakes or chunks (mothballs) are a pretty effective repellent. Once you are sure the animals are all out, the last step — the one too many people seem to ignore — is to *keep* them out. To do this effectively, you have to animal-proof your house. By sealing all openings larger than 1/4 inch (mice and bats can get through openings this small) you should be able to keep any mammal pests from returning.

Occasionally raccoons and squirrels may build nests in chimneys, which they must consider to be good substitutes for den trees. Many a homeowner has started a fire in the fireplace, only to end up with a room full of smoke. If you can successfully oust the animals and remove the nesting materials, then place a screen or other fire-proof obstruction over the top of the chimney to keep them from returning.

Birds that insist on building their nests in every nook and cranny they can find in and around your home can be just as bothersome and maybe even harder to discourage. House sparrows and pigeons can really make a mess around vents and gutters, window ledges and porches, with nesting materials and droppings scattered everywhere. Even the beautiful barn swallow, with its valuable insect-eating service, can be a pest. My grandfather fought a constant battle with them in his garage, where their droppings managed to land on his car. In general, the methods for getting rid of these avian pests are similar to those for getting rid of mammals, but in places like garages and barns, where it would be difficult to seal them out, you may have to be more creative. One summer we arrived for a visit on the farm and discovered that Grandpa had hung several fox tails in his garage, and every last barn swallow had moved out.

The woodpecker tops the list of bird pests around some suburban areas. Housing developers may be at least partly to blame for this. They cut down all the mature trees



and replace them with houses made of natural wood siding. It's possible that the woodpeckers mistake these houses for some kind of super-trees, and they make themselves at home, drumming to proclaim their territorial rights and attract a mate, excavating holes for their nests, and searching the cracks and crevices for insects to eat.

"It's funny how people change their attitudes toward animals when they run into a little problem," said Donald Harke, supervisor of the Wildlife Assistance Office for the United States Fish and Wildlife Service in Raleigh. "They want to see the woodpecker, until it starts doing a little damage to their house. Then it becomes an adversary."

One woman called Harke saying she was an avid birdwatcher, even a member of the Carolina Bird Club — but she had a woodpecker drilling holes in her house and could she please have some poison to get rid of it!

The most bothersome woodpecker in this area is the yellow-shafted flicker. The flicker and all other woodpeckers are protected by the Migratory Bird Treaty Act and may not be killed without a federal permit — even if caught in the act of damaging your home. Usually it is not necessary to kill the bird, anyhow — the trick is to scare it away before it becomes habituated to the area. It may be possible to frighten it with rubber snakes, hawk silhouettes, strips of aluminum foil or small windmills attached near the problem site. You may be able to deaden the sound by placing insulation or other padding under the drumming place. Any damage to the house should be repaired quickly so it doesn't attract more birds. If the birds are feeding on insects in your siding, an application of insecticide may be needed to protect your siding from the woodpeckers as well as from the insects.

Sometimes wild animals stumble inadvertently into homes or buildings and then panic when they can't find their way out. Scott Osborne, the Commission's Deer Project Leader, rattled off several incidents involving deer in such unlikely places as living rooms, motel rooms, ice skating rinks and shopping center parking lots. Sometimes they walk through doors, other times they fall or jump through windows. They are often sick, injured, or being chased by dogs when these incidents occur. One day a bear strolled into the Macon County courthouse!

Also common are incidents involving squirrels, raccoons, skunks, birds, snakes and all kinds of animals that accidentally find themselves trapped in buildings. A frightened deer can demolish your living room in seconds, but even an animal as small as a squirrel can wreak havoc once it starts tearing around your house, jumping from bookshelves to curtains to china cabinets. Rick Goode, a wildlife enforcement officer, answered a call in Chapel Hill recently about a squirrel that had fallen into a chimney. He had just about managed to get the squirrel into a box when it jumped out, ran across his shoulders, through the living room and into the bedroom. It scampered around the bedroom, across the keys of a personal computer, and finally found its way out an opened patio door.

"The most important thing to do is just give the animal an obvious way out, leave it alone to find it, and then close up the entry points so it can't get back in," said Osborne. "Most problems with wild animals could be solved this way if people would just use a little common sense and figure out how they got in to begin with."

(Of course, if you've had a deer come in through your window the problem is a little more complex. About the best you can do is stay calm, and do what you can to keep the animal calm, until it finds the door.)

Raccoons, being exceptionally intelligent, can also be exceptionally troublesome when it comes to raiding garbage cans. There is almost no predation on raccoons in urban areas, where their numbers outweigh the surrounding rural populations. They can create quite a mess on their nightly raids, and a good raccoon can circumvent almost any protection the irate resident cares to devise for his trash. Sometimes they seem to spread trash about for amusement's sake alone. One raccoon, after picking choice morsels from garbage cans or gardens, learned to lift the cover on an outdoor hot tub to wash its dinner.

About the only sure way to keep animals out of your garbage is to keep the garbage inside the house or garage until just before pick-up time. Having a tightly fitting lid for your garbage can, or one that is mechanically fastened on in some way, is the next best thing. And eliminating other sources of food helps also. Too often, wild animals are found to be dining largely on the food put out by pet owners for their dogs and cats.

Above all, don't feed wild animals! With the exception of bird feeders and natural plantings to attract desirable wildlife to your yard, it is best to let the

animals fend for themselves. Animals tend to congregate around artificial food sources, and this can aid in the spread of diseases and parasites. In clost contact with people, there's always the chance that a semi-tame wild animal will bite someone, which would result in the needless destruction of the offending animal to be checked for rabies.

Wild animals should not learn to associate food with people, nor should they be allowed to lose their fear of them. A great horned owl that had been raised in captivity and released was beaten to death by frightened hikers who misunderstood its intentions when the owl flew up to them expecting a handout. And I read of one instance where some people began feeding one skunk in their yard and ending up feeding six fully scented skunks inside their house. Now that's asking for trouble!

One woman who had been feeding four foxes in her yard (again, she started out feeding one) asked me how to get rid of them. I could not convince her that all she had to do was stop feeding them. She seemed to think they'd starve without her help. That's a common misconception. Wild animals may become accustomed to your handouts, and will take advantage of them as long as you keep offering them, but they are not dependent on you for food. Once you stop feeding them, they'll go right back to their natural food sources (or, unfortunately, become a pest at someone else's back door).

Whether you live in the country, in the suburbs or in the middle of a city, your garden is not safe from the many furred and feathered free-loaders that lurk in the bushes, ready to make off with the fruits of your labors. They fly in from above, burrow in from below, hop over fences and crawl under them. While these pilfering pirates may cause less economic damage

Controlling Wildlife Pests

Species: Raccoon
Problems: Agricultural, fruit and vegetable crop depredation; may kill poultry or other small farm animals; raid garbage cans; prey on eggs of sea turtles, waterfowl and other birds; may carry rabies.
Non-Lethal Controls: Wire, electrified fence around gardens, poultry yards, etc.; flashing lights, noise-makers, etc.; remove daytime cover adjacent to problem areas; store pet foods and garbage in tightly sealed containers; live-trap and relocate.
Lethal Controls: Shooting, trapping (encourage hunting and trapping in season).
Legal Status: Game, furbearer — hunting or trapping license required in season, depredation permit required otherwise.
Benefits: Sport hunting, trapping, meat and fur; high aesthetic value.

Species: Blackbirds/starlings
Problems: Sprout-pulling damage, odor and noise at roosts, damage to ornamental plants, mature crop damage, feedlot depredation, transmission of diseases (especially Histoplasmosis).
Non-Lethal Controls: Scare devices (visual or noise-producing), avian stressing chemicals, screens or nets over fruits and vegetables, habitat alteration. Initiate control as soon as problems arise and be persistent.
Lethal Controls: Shooting, trapping, toxic chemical baits, avian stressing agents.
Legal Status: Blackbirds, cowbirds, grackles: federally protected — permit needed unless committing or about to commit depredation. Robins: federally protected — may never be killed without permit. Starlings: pest species — no permit needed to kill at any time.
Benefits: Potential food source; used in biological control of Japanese beetles; eat harmful insects.

Species: Bats
Problems: Roosting in buildings — accumulation of droppings, offensive odor and noise; known to occasionally carry rabies in N.C.; may carry Histoplasmosis and other diseases.
Non-Lethal Controls: Seal structures to prevent entry; repel with napthalene flakes or balls; visual and noise repellents.
Lethal Controls: DDT — may only be used where there is a demonstrated health threat due to rabies — must have permit from the Center for Disease Control, Atlanta, Ga.
Legal Status: Federally protected — migratory mammals — must have federal permit for control. Indiana and gray bat are endangered species — may not be killed.
Benefits: Eat large quantities of insects.

Species: Mole
Problems: Burrowing in lawns, gardens and golf courses.
Non-Lethal Controls: Remove food source — use insecticide on lawn; install sheet metal or hardware cloth fence around garden.
Lethal Controls: Spear-type traps in major runways.
Legal Status: Nongame — state depredation permit needed.
Benefits: Eat large quantities of insects.

Species: Chipmunks
Problems: Damage to flower bulbs, ornamental trees and shrubs; depredation on grain, garden vegetables and nut crops.
Non-Lethal and Lethal Controls: Same as for voles (above).
Legal Status: Nongame — state depredation permit needed.
Benefits: Aesthetic value.

Controlling Wildlife Pests *(continued)*

Species: Woodpeckers (especially yellow-shafted flicker)
Problems: Noise nuisance — male drumming on homes; pecking holes in natural wood siding — foraging for insects or nesting and roosting.
Non-Lethal Controls: Treat wood siding for insect infestation, cover holes or "starts" with sheet metal or wire as soon as detected; deaden sound by placing padding behind drumming sites; visual repellents (rubber snakes, hawk silhouettes, aluminum strips, etc,) placed near problem sites.
Lethal Controls: May only be killed with a federal permit, even if caught damaging house — no exceptions.
Legal Status: Federally protected, migratory species — permits to kill rarely issued. Red-cockaded woodpecker — Endangered Species — may not be killed (not known to cause damage).
Benefits: Eat large quantities of insects.

Species: Pigeons
Problems: In urban areas — droppings deface buildings, statues, park benches; outside stairways and railings become slippery with feces. In rural areas — crop and feedlot depredation. May transmit diseases and ectoparasites.
Non-Lethal Controls: Habitat and building modifications to discourage roosting and nesting; chemical stressing agents, chemically treated bait that causes infertility to limit populations.
Lethal Controls: Shooting, toxic perches and poisoned grain baits (restricted use).
Benefits: Aesthetic value — one of the few forms of wildlife that urban dwellers see; many people enjoy feeding them.

Species: Squirrels (fox, gray, flying and red)
Problems: Denning in buildings; gnawing on siding, electrical wires, etc.; damage to fruit and nut crops and trees; corn depredation; may carry rabies (although not known to in N.C.).
Non-Lethal Controls: Seal all entries to buildings: repel with napthalene flakes or balls; metal bands around tree trunks; fences around gardens, crops; pruning tree limbs to limit access to crops, buildings.
Lethal Controls: Shooting (encourage hunting in season).
Legal Status: Game — state depredation permit needed out of season.
Benefits: Sport hunting, edible meat; cached nuts plant new trees.

Species: Snakes (all species)
Problems: No property damage — main problem is people's fears, and small possibility of being bitten by poisonous species.
Non-Lethal Controls: Remove food (especially rodents) and cover (brush and wood piles, weeds, etc.); seal all openings in buildings; fence in small areas; live trap and relocate.
Lethal: Sever head with long-handled hoe or shovel; shooting.
Legal Status: Unprotected unless on the Endangered or Threatened Species List.
Benefits: Very helpful in insect and rodent control.

Species: Rabbits
Problems: Damage to garden and truck crops; damage to bark and stems of ornamentals, fruit and nut trees; possible transmission of disease (especially Tularemia).
Non-Lethal Controls: Protect gardens with wire fencing; put hardware cloth or other metal guards around stems and trunks of trees and shrubs; chemical repellents; live-trap and relocate.
Lethal Controls: Shooting (encourage hunting in season).
Legal Status: Game — hunting license required in season, depredation permit otherwise.
Benefits: Sport hunting, meat.

than the big-time depredation specialists, they are still big-time nuisances.

If you enjoy seeing wild animals in your yard, but want to grow a few vegetables and flowers too, then you're faced with a real dilemma. But, with a little planning and clever landscaping you may be able to harvest some of your garden crops and share your yard with wildlife, too.

Your first task is to discover which ungrateful little creatures are ripping you off. Deer, chipmunks, mice, rats, voles, rabbits, skunks, raccoons, opossums, squirrels, groundhogs, crows, and many species of songbirds are among the prime suspects. Look for clues like teethmarks, tracks, droppings, burrows, etc. Once you have identified the culprit, do a little research on its habits and habitat. Often understanding the animal is the key to controlling it — whether you want to eliminate it or just keep it from stealing you blind.

Finally, it's up to you to initiate the most appropriate controls, within any legal restrictions that apply. There are all kinds of non-lethal controls available. Using several control methods together, or alternately, are better than just using one, because animals may get used to one control and it will cease to work.

"Scare tactics" work well, some of them as old-fashioned as the scarecrow, others as high-tech (but not necessarily effective) as electromagnetic devices. In some cases, the control may turn out to be more costly or troublesome than the damage itself. For example, I wouldn't recommend the idea of hanging a kitten in a bird cage from your favorite cherry tree to scare away birds — the noise will drive you crazy. And someone who would burn down a house to get rid of snakes would obviously be foolish. On the other hand, something as simple as tying a dog at the edge of your garden might effectively deter some midnight marauders.

Animal repellents vary from bags of human hair to lion manure to moth balls to rotten eggs. Obviously, some of these are harder to come by and messier to apply than others, but are said to be fairly effective. Poisons should be used only as a last resort, and may be seen as a sort of ecological defeat. Where poisons are applied, especially in urban areas, be sure to adhere to legal and safety restrictions and take every precaution to be sure they are not available to non-target wildlife species, domestic animals or children.

The most effective controls are usually those that alter the habitat that has attracted the pests in the first place. For example, you could consider giving up

gardening. Since I don't think that's what most people would consider a satisfactory solution, maybe you could consider planting something for the animals that would distract them long enough for you to harvest something from your garden for yourself — sort of a buffer crop. Or, you could encourage the presence of natural predators like hawks, skunks or snakes (if they aren't on your pest list also).

Probably the best solution to garden depredation is the one that's most obvious — a fence. "Good fences make good wildlife." It's as simple as that. There are numerous fence designs available to keep out specific kinds of animals, and if you're bothered by several species, be creative and design something that will suit your needs. The Agricultural Extension Service has information available on fences, and there is also an excellent new book out called *Wildlife in Your Garden or Dealing with Deer, Rabbits, Raccoons, Moles, Crows, Sparrows, and Other Creatures in Ways That Keep Them Around but Away from Your Fruits and Vegetables* (by Gene Logsdon, 1983, Rodale Press).

There are a couple of points to remember about wildlife pests. Too often our judgments about whether or not an animal is a pest are colored by subjective factors, such as appearance. Many a farmer or gardener who would kill a rat or mouse on sight will let a cute little chipmunk steal him blind. One gardener watched a chipmunk run off with one of his prized flower bulbs and remarked, "I know that chipmunks are just rats in striped clothing, but I love 'em!" And ever since the temptation of Eve in the Garden of Eden, the snake has been seen as the symbol of evil. But most snakes cause little or no economic damage, and seldom hurt people. In fact, they're handy to have around because they prey on insects and rodents.

Ever since our nomadic ancestors gave up their wandering ways for a more sedentary lifestyle, humans and wild animals have had their run-ins. And in our time, as human dwellings continually push out into former wildlife habitat, animals end up getting the short end of the stick. "More and more, I've found that people are making their own problems and the wild animals are just trying to survive," says Don Harke. "People are hypocritical about the animals we share the planet with — if an animal gets in the way, people want to do them in. We try to help people when they have problems, and still take into account that our primary objective is to protect and conserve the wildlife resource."

Whether it's an owl in the attic, a mole in the lawn or a rabbit in the garden, we're mostly responsible for the conflicts we have with wildlife pests. We should be equally responsible for finding solutions that respect our wildlife neighbors. Perhaps we are the ones who should change our ways. Perhaps we are the ones who should be willing to give some in order to meet the needs of wildlife.

One final point to remember is that these extremely successful species that are causing us problems today may one day be the only wild animals that many city-dwelling humans will ever know. Millions of people will continue to enjoy the peaceful pastime of feeding pigeons in the park, and children will delight in the antics of squirrels chasing each other through suburban treetops or balancing like tight-rope walkers on utility wires. And maybe for that reason alone they should be tolerated within our midst, for, as Thoreau has told us, "In wildness is the preservation of the world." ⊠

Before undertaking any type of animal damage control, be sure you are aware of any legal restrictions that apply to a particular species. In addition to state and federal laws and permits required, there may also be local restrictions such as laws prohibiting the use of firearms in urban areas, the use of pyrotechnics as scare devices, or the use of certain chemicals.

Also, certain species are protected by federal laws and require permits from the U.S. Fish and Wildlife Service in addition to state permits before any kind of control is undertaken.

For information on controlling wildlife pests, or technical assistance, write or call:

North Carolina Wildlife Resources Commission
Division of Wildlife Management
512 N. Salisbury St.
Raleigh, N.C. 27611
(919) 733-7291 (for deer, bear, raccoon, fox and other game species)

N.C. Agricultural Extension Service
North Carolina State University
Campus Box 7617
Raleigh, N.C. 27695-7617
or call your county agricultural extension agent (in phone book under N.C. Agricultural Extension Service.)

United States Fish and Wildlife Service
Donald Harke
Wildlife Assistance Office
Federal Building
Raleigh, N.C. 27611
(919) 755-4124

If you have concerns about rabies, Histoplasmosis or other wildlife diseases that may be transmitted to humans, contact:

Dr. John Freeman
N.C. Division of Health Services
PO Box 2091
Raleigh, N.C. 27602
(919) 733-3410

Jordan Lake Mishap

Duck Hunting Trip Has Chilly Ending

Written and Edited by Mark Taylor

Bad weather can quickly change an enjoyable outing into a near disaster. Perhaps no one knows this better than Gary Pendleton of Raleigh. He and his brother were duck hunting on nearby Jordan Lake in mid-December when their boat suddenly swamped.

"We left the launching ramp before dawn in our 12-foot johnboat, and everything was fine," said Pendleton. "The water was calm, and we crossed the wide section of the lake and pulled over to a point of land. We set out our decoys and began to hunt. By 8 in the morning the wind was gusting at 25 to 30 m.p.h., and the lake was covered with whitecaps 24 to 30 inches high."

The men decided to wait out the storm, and noted that conditions had eased some by 2 o'clock in the afternoon. Although there were still whitecaps on the lake, they decided to cross the open water to get back to their launching ramp.

"The boat swamped about 300 to 400 yards from shore," said Pendleton. "Waves broke over the side, and it suddenly just filled. Conditions were still pretty bad, and I was really scared. The waves were so tall that I couldn't see over them. Once we hit the water, my brother immediately lost his breath. My hipboots filled with water and I could feel them dragging me down, so I kicked them off. It's a good thing I wasn't wearing chest waders or I'd have gone straight to the bottom. Fortunately, my brother and I were both wearing life jackets. I started to let go of the boat and swim for shore when I remembered that you always stay with the boat. I hollered at my brother, and we managed to hang on to the capsized boat until we drifted to a small island."

When the men reached the island, Pendleton immediately built a makeshift lean-to for his brother using the boat for shelter. Then, wearing his life jacket, he decided to swim from the island to shore — a distance of about 400 yards.

"I knew that if we stayed on the island overnight we would probably freeze to death, and we hadn't seen another boat all day. I gave out about two-thirds of the way across, and I'm a pretty strong swimmer. Fortunately, the wind and waves carried me to shore. Then, I walked two miles in my stocking feet through the woods to the nearest road. That was pretty rough. A farmer stopped and gave me a ride to the Wilsonville store where we phoned the Wildlife Commission's toll-free Wildlife Watch hotline."

Wildlife enforcement officer Rick Goode of Pittsboro was immediately dispatched to the scene, and soon arrived with blankets and warm clothing.

"Officer Goode and I returned to the island to pick up my brother," said Pendleton. "My brother had found a cigarette lighter in a waterproof ammo case that I used as a tool box, and had built a fire. He was still very cold, and Officer Goode made sure that my brother and I were both warm by loaning us some personal clothing while he recovered our boat and gear. We returned to the ramp, and he had the rescue squad waiting in case we had any problems with hypothermia. He insisted that we stay in the ambulance and warm up while he loaded our boat and gear. He was not only a very professional officer, but was very warm and caring. We deeply appreciate his help; he definitely went beyond the call of duty."

While this winter boating accident didn't end in tragedy, many do. "Officer Goode's actions were certainly commendable, and this incident illustrates how vitally important it is to practice safe boating in the winter," said Gene Abernethy, chief of the Division of Enforcement for the N.C. Wildlife Resources Commission. "If these men had not been wearing life jackets, they probably would have drowned. Hypothermia is a real threat in the late fall, winter, and early spring. Anyone who goes out on the water at this time of year should always wear a life jacket, plenty of warm clothing, and use a boat that can handle rough weather conditions that are common in winter."

D.U. Receives Contribution

Ken Taylor

Dollars For Ducks: *The Wildlife Commission recently presented a check for $7,750 to Ducks Unlimited for habitat development in Canada. By statute, one dollar from the sale of each nonresident hunting license sold in North Carolina is contributed to Ducks Unlimited. Here, J. Robert Gordon (right), chairman of the Wildlife Commission, presents the contribution to Don Manley, regional supervisor of Ducks Unlimited. The contribution will be used for a black duck project in the Maritime Provinces of Canada.*

Fish-Cake Fever Strikes

Ever Gigged A Red Horse?

Late winter and early spring mark the spawning season for many fish — including suckers. While many people look down their noses at these fish, an evening spent sucker-gigging offers some exciting sport and delicious fare for the dinner table.

Red horse, hog nose, white, spotted, northern hog and chubs are the names of some of the species of suckers common to North Carolina creeks and rivers. Although sucker runs are found in streams throughout the State, sucker-gigging is usually confined to Piedmont and foothills streams because eastern streams are often too deep for wading and the suckers found in mountain streams are fairly small. All you need for the sport is a gig, high-powered flashlight, and a pair of waders. The fish stay in deep water during the day, but they can be found crossing shallows and rapids at night.

"The Dan, Haw, Yadkin, Pee Dee, Uwharrie, Little, Deep, Catawba, Eno, Neuse and Tar rivers all host sucker runs," said Cape Carnes, Piedmont supervising fisheries biologist for the N.C. Wildlife Resources Commission. "Many of the tributary streams that feed these rivers also offer good sucker gigging."

What do sucker giggers do with their catch? Grinding the fish up into fish cakes is a common practice. Other people pack the meat in one-pint canning jars with water, a pinch of salt, and a pat of butter. Then, the meat is cooked in a pressure cooker and the end product is often compared to canned salmon (when pressure-cooking fish, be sure to have a complete seal on the can and cook an adequate length of time to prevent botulism). Another point to remember when preparing suckers is that the fish are full of small "floating bones," and the meat must be cooked sufficiently to soften these bones before consumption.

Gigs are classified as special devices, and sucker giggers must possess a special-device, personal-use license for sport or a special-device, nonpersonal-use license if they intend to sell their catch.

— *Terry Shankle*

N.C. Safe So Far

Gypsy Moths Controlled

There's good news from the folks who've been looking for gypsy moths in North Carolina. A survey has turned up no new egg masses or female insects anywhere in the State, even at sites of former infestations in Raleigh and Selma that were treated in 1982. Gypsy moths in the Northeast have caused serious defoliation of forests, often killing substantial numbers of trees. The gypsy moth survey in North Carolina is being conducted by the U.S. Department of Agriculture, N.C. Forest Service, and N.C. Department of Agriculture.

"The number of gypsy moths caught in our survey traps in 1983 was down sharply from the previous year," said Coleman Doggett, an entomologist with the N.C. Forest Service. "Last summer, we caught about 3,000 male gypsy moths in 13,000 traps located throughout the State. This total is a 70 percent reduction from the previous year, and probably reflects declining populations of gypsy moths in the Northeast where the peak of the current infestation has passed."

Doggett says that the presence of male moths in North Carolina does not mean that gypsy moths are present and multiplying in the State. Only male gypsy moths are able to fly, and many of these insects "hitchhike" into the State on vehicles that have passed through infested areas in the North or are even carried down by storms. The lack of egg masses, female insects, and moths in various life stages indicate that treatments in infested areas were effective, and show that the insects are not yet multiplying in North Carolina.

"It's heartening to learn that the treatments for gypsy moths worked in the infested areas, and no new infestation sites have been found in the State," said Doggett. "Still, it's only a matter of time until gypsy moths reach North Carolina. The general population front for gypsy moths is moving steadily South, and is now at the James River in Virginia. Gypsy moths will probably be causing defoliation problems in North Carolina in 10 years or so."

Planked Shad A River Feast

Carolina shad fishermen are getting a bit antsy now that the annual migrations of hickory and white shad are underway in coastal streams and rivers. Shad were called "elft" or "eleven fish" by early Dutch settlers because the first fish were traditionally caught on March 11. These early settlers generally cooked their first shad on a plank near the open flames of a campfire, a trick that they learned from coastal Indians. The technique hasn't changed much in the intervening centuries, and still produces a delicious fish dinner.

My experience with shad fishing includes a fair amount of time spent around a creek-bank campfire warming numbed fingers between net checks and casting shad darts. If you've had any luck at all, that's an excellent time to plank a shad.

To plank a shad Indian-style, clean the fish first, rinse it, and wipe it dry. Cut through the ribs from the inside just to one side of the backbone and flatten the fish. Select a piece of heavy bark or a board (hardwoods are preferred) about one foot longer than the fish. Heat the plank by the fire. Fasten the fish to it securely by the tail with the scales next to the plank or on the concave side of the bark. Season and baste the flesh with cooking oil or bacon fat, and fasten a couple of strips of bacon from the tail end of the fish to furnish some basting. Support the plank with sticks, stones or bricks — whatever is available — propping it upright, tail-end up, in front of a good campfire. You don't need to wait for a bed of coals because the cooking is done facing the fire, and the fish is not in direct contact with the flames. Baste the fish occasionally with oil or fat as it cooks.

When the fish is golden brown and the flesh flakes to a prod, lift out the bones and add salt, pepper and lemon juice. Eat the fish right from the plank. This cooking technique also works well with most other fish and small game birds.

— *Curtis Wooten*

37-Pound Whopper

Record Buffalo Fish Caught

Terry Knight

A Handful Of Trouble: *Terry Knight (right) of Gastonia and his father hold the new state record buffalo fish that the young angler recently caught in Lake Wylie. Knight fought the fish for 35 to 40 minutes.*

Thirty-seven pounds is a lot of fish — that's the weight of the new State record buffalo fish recently caught by 17-year old Terry Knight of Gastonia. The young angler caught his state record fish approximately two miles south of the Buster Boyd bridge on the North Carolina side of Lake Wylie.

"I'd been fishing for about five minutes when the fish hit," said Knight. "I was using some scratch bait made by my Uncle Dewey, and the line was in about 40 feet of water. The cork on my line went under, and when I jerked my rod I could tell I had something on that was pretty good sized.

"I didn't know what it was, but believe me I was scared. I thought I had hung him pretty good, so I loosened up the drag and let him go."

Knight fought the fish for 35 to 40 minutes before landing him. The 37-pound fish was 39-1/2 inches long, and was taken on 20-pound test line. The previous State record buffalo fish weighed 26 pounds-10 ounces, and was also caught in Lake Wylie.

Reader Likes Balanced Format

Dear Sir:

It seems unbelievable but it is happening: *Wildlife In North Carolina* is getting better and better with each issue. The articles are well written, well laid-out, and the photo work superb. The balance of issues is highly commendable, especially hunting vs. conservation vs. protection. I particularly appreciate the articles on practical items such as bird feeding!

Once again, I'm proud to be a North Carolina native and a subscriber to *our* magazine. My "pride" includes a gift subscription to the publisher of a noteworthy publication in the Maine-New England area. I'm sure she'll appreciate it as I do.

Thanks for the great work!

Christopher Mitchell
Weirs Beach, New Hampshire

Two For Price Of One

Wildlife Calendars On Sale

Wildlife art enthusiasts are in luck — for $5, they may obtain copies of both the 1982-83 and 1983-84 North Carolina Wildlife Calendars. These calendars feature a beautiful series of wildlife prints, and have been very popular as calendars and also with collectors and hobbyists who frame or use the prints in crafts projects. Artists featured in the calendars include Bob Binks, Bob Dance, Cecil Eakins, Larry Barton, Duane Raver, Lee LeBlanc, Bob Timberlake, Sally Middleton, and Don Balke. The calendars were produced by the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the N.C. Wildlife Resources Commission to provide information, guidance, and support for agency conservation programs. Proceeds from the calendars will be used for these purposes.

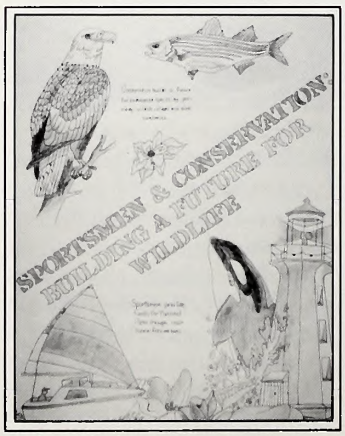
"These calendars have been tremendously popular, and are beautiful additions to anyone's home or office," said George Mason, chairman of the Chairman's Wildlife Advisory Committee, "They also make fine Christmas gifts. There is a limited quantity left, so we're offering both calendars for the price of one. The calendars will be sold on a first-come, first-served basis until the supply is exhausted."

Calendars may be ordered by sending $5 to the Chairman's Wildlife Advisory Committee, % George Mason, P.O. Box 473, Dallas, N.C. 28034. Checks should be made payable to the Chairman's Wildlife Advisory Committee.

Featuring Wildlife Conservation

Tar Heel Wins Poster Contest

A Winner: *Karin Johnson of Kill Devil Hills submitted this winning poster in the 1983 National Hunting and Fishing Day Poster Contest. The event is sponsored by the National Shooting Sports Foundation, and Karin competed against thousands of other students in the national competition. Karin is a 10th grader at Manteo High School, and her entry was sponsored by the Pea Island Wildlife Refuge.*



Students may also wish to participate in the 1984 National Hunting and Fishing Day poster contest. The theme for the event this year is "How Sportsmen's Duck Stamp Dollars Help Wildlife." For more information, contact the National Shooting Sports Foundation, Poster Contest, P.O. Box 1075, Riverside, Ct. 06878.

Contribute On Line 21

Help Wildlife At Tax Time

If you haven't returned your state income-tax form yet, you've still got time to help wildlife by contributing to the nongame wildlife tax checkoff. This program allows residents of North Carolina receiving a refund from their State income tax to designate that a portion or all of the refund be used for the management and protection of nongame and endangered wildlife.

Nongame wildlife species are those which are not hunted or fished for, and include most birds and small animals. Endangered wildlife species are those which have been legally declared to be in danger of extinction.

"We urge all North Carolinians to support the tax checkoff," said Jack Donnelly, coordinator of the nongame program for the N.C. Wildlife Resources Commission. "In the immediate future, the tax checkoff will fund restoration and management programs for bald eagles, peregrine falcons, and loggerhead sea turtles. Funds will also be used to further develop a statewide environmental-education program for our schools."

Start by taking a close look at the instructions for your 1983 North Carolina State Income Tax form. On page 2 in the lower right-hand corner are instructions on how to contribute to the North Carolina Nongame Wildlife Fund. If you wish to support this fund, enter a donation from your refund on line 21 of the tax form. You may designate that a portion of your refund (not less than $1) or all of your refund be used to protect nongame and endangered species. This donation will not increase the tax you pay, and may be deducted from your income on the following year's tax form. If your tax returns are prepared professionally, tell your accountant that you wish to contribute to the nongame wildlife fund.

If you aren't receiving a refund but wish to contribute to the nongame wildlife fund, tax-deductible contributions may be sent to the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611. Please note on the check that the money is to be used for nongame and endangered species.

A Parable For Us?

Mockingbird Calls Grim Reaper

An old parable ends with the advice, "Beware of what you ask for, surely you will get it." Having a four-year old son, I know this is a hard lesson to learn firsthand. However, the other day I heard a story that may illustrate my point.

A friend of mine had a parrot named "Doc" who had learned to call the family cat. "Here kitty, kitty" was one of Doc's favorite sayings. One day my friend overheard a mockingbird imitating the parrot's "Here, kitty, kitty. . . ." During the next few days the mockingbird improved its diction until at last the cat answered its call. All my friend found of the mockingbird was a few scattered feathers.

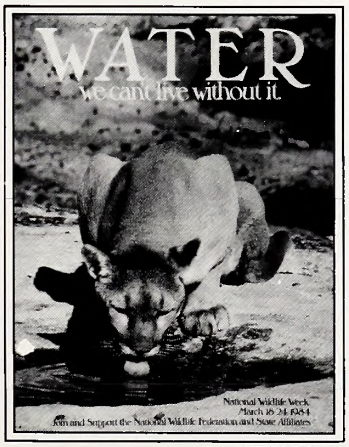
Like many of us, the mockingbird wasn't fully aware of the implications of what it was asking for. Many of us want more money and more things, and we frequently let this quest influence our moral and legal compasses.

As an environmentalist, I have been accused of viewing the world through "green-shaded glasses." I see our environment, our water, air and land being spoiled by our "balance-sheet morality." I can see the cat in cases like Times Beach and Love Canal. We've given the call "Here, kitty, kitty" and it is quietly creeping towards us.

— Jay Davies

Slated For March 18-24

Water Is Theme For National Wildlife Week



National Wildlife Federation

"Water — We Can't Live Without It" is the theme for this year's National Wildlife Week which will be observed from March 18-24. The event is sponsored by the National Wildlife Federation, and promotes sound conservation. Here are a few interesting facts about water:

— Although 75 percent of our planet is covered by water, only 3 percent of this is fresh water at any one time — and 75 percent of the world's fresh water is locked up in glaciers and polar icecaps. The remaining fresh water is constantly exchanged between the surface of the oceans, Earth, plants, and animals in a process called the "hydrologic cycle."

— This recycling process has maintained a constant amount of fresh water on Earth for about 3½ billion years. This water has taken many different forms, but has not been destroyed.

— Americans use as much as 700 billion gallons of fresh water per day, 18 times more water than was used per day in 1900.

— In some parts of the country, we are using water faster than it is being replenished. In Florida and Arizona, for example, groundwater is being used faster than aquifers are recharging, causing land to sink and huge crevasses and craters to open. In the Southeast, seven states and Mexico have legal claims to more water in the Colorado River than this waterway usually carries.

— Over 50 percent of our nation's drinking water comes from underground sources. Yet, groundwater is being contaminated by toxic chemicals, pollution that is often difficult if not impossible to clean up.

For more information on National Wildlife Week, contact the National Wildlife Federation, Educational Services, 1412 16th Street, NW, Washington, D.C.

Track Identified

Clue Left

The first solid evidence of the existence of the eastern cougar was recently found in Massachusetts, reports the Massachusetts Division of Fisheries and Wildlife. A confirmed cougar track was identified in a wild area of western Massachusetts. A cougar was seen crossing a road, and the observer immediately notified a local wildlife officer who reported the sighting to the Cooperative Wildlife Research Unit of the University of Massachusetts. Virginia Fifield, head of the Massachusetts eastern cougar survey team, searched the report area and found a perfect cougar track — measuring 3-1/2 by 4 inches — in a mud puddle. Several cougar experts from throughout the nation were called in, and confirmed the track as that of a cougar. Despite many sightings and an extensive search, this is the first track that has been positively identified as a cougar track in the eastern United States except for Florida, where a very small population of Florida panthers, a subspecies of the eastern cougar, may still exist.

"While this track is an exciting discovery, it still does not mean that there is an existing population of eastern cougars," said Fifield. "All this means is that a cougar was in the area — it could be a wild cougar, an imported animal, or an escaped pet. More study is needed to determine if a population of eastern cougars has survived in western Massachusetts."

Calendar Of Events

March 10
Moore County Hounds Hunter Trials at Southern Pines. For more information contact Mrs. Edith Overly, Sheldon Rd., Southern Pines, N.C. 28387.

March 10
Old Quawks Day at the Municipal Park in Morehead City. Quawk-calling contest, flounder flinging, scallop skipping, and other events. For more information, contact the Carteret County Chamber of Commerce, P.O. Box 1198, Morehead City, N.C. 28557.

March 17
Third annual Trout Unlimited Expo and Auction at 1 p.m. at the Duke Power Company Woodlawn Center in Charlotte. Sponsored by the Rocky River Chapter of Trout Unlimited, the event will include a casting clinic, fisheries displays, movies, auction, and other events.

March 17-18
Sandhills Open Skeet Shoot at the Pinehurst Gun Club in Pinehurst. For more information, write to the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

March 18
"Put A Little Wild In Your Life" Exhibit at the Schiele Museum of National History in Gastonia. Exhibits feature backyard wildlife management, raptor rehabilitation, and other conservation themes. For more information, contact the Schiele Museum of Natural History, P.O. Box 953, Gastonia, N.C. 28053.

March 22-25
Outdoors North Carolina Expo and Sportsman Show at the Civic Center in Raleigh.

March 23, 24, 25
N.C. Wildlife Federation annual convention, Civic Center, Raleigh. For more information, contact the N.C. Wildlife Federation, P.O. Box 10626, Raleigh, N.C. 27605.

Wildlife Boost

Ken Taylor

Too Good To Miss: *Prints of North Carolina's 1983 sportsman's stamp, which was created by well-known North Carolina wildlife artist Duane Raver, are still available. The image size is 6-1/2 by 9 inches, and orders for this time-limited edition will be accepted through March 31, 1984. The cost of each print is $90. The value of the print is expected to appreciate considerably in the future. A royalty from the sale of each print will be donated to the Wildlife Commission, and will be used for wildlife conservation. These prints are not being sold by the Wildlife Commission, but are available from art dealers throughout the State.*

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status On November 30, 1983

	Number Sold	Revenue Received
Lifetime Hunting Sportsman's License	6,800	$1,995,554
Lifetime Hunting License	82	$13,898
Lifetime Fishing License	291	$47,739
Lifetime Subscriptions to *Wildlife In N.C.*	220	$24,370
Contributions		$30,837
		Fund Total: $2,112,400

Steve Maslowski

Check-In For Wildlife

NOT EVERY CREATURE is wise enough to survive without your help. Your tax-deductible donation will ensure a future for nongame and endangered wildlife.

Look for line 21 on your 1983 State Income Tax form D-400 and enter your contribution.

Portsmouth At Dawn

Surf fishermen tend their rods as the sun rises on the beach at Portsmouth Island.

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The Kool-Aid Catfish

by Jim Dean

When the dish containing catfish No. 13 was placed in front of my friend, Hugh Burts, he looked at it and burped softly. I was eyeing my own 13th catfish with equal misgivings. What had started as a simple dinner at a fish camp had turned into a contest. Neither of us had said a thing about it as we matched each other fish for fish, but somewhere along about the 6th catfish, it had become clear that I was defending some dubious gustatory honor. And Hugh, a visitor from Louisiana's Cajun country, was not about to make it easy.

"You going to eat that thang?" Hugh asked.

"Sure," I said, thinking that a good offense was the best defense. "We paid for all we can eat, and I aim to get my money's worth. A baker's dozen ain't nothing. I normally eat about 16 or 17 and my record is 21." That, of course, was a bald-faced lie.

"You're too scrawny to eat so much," Hugh said. "You must be hollow."

I took a bite, trying to look enthusiastic. Hugh peeled off a tiny flake of his fish and forked it down. Slowly, we added to the bone piles. My last bite rested somewhere at the top of my throat, and only a ramrod would have moved it any further. Both of us were sitting bolt upright like two brimful glasses, fearful that the slightest tilt might result in a spill.

illustration by Lambert Der

The waitress returned. "Couple more?" she asked. Hugh and I reached across the table simultaneously and shook hands. It was a draw.

The catfish family is undoubtedly one of the most misunderstood of all the piscatorial tribes. As sportfish, they are often held in low esteem. "They don't jump," you hear it said, yet neither does the lordly bonefish. "They pull like a waterlogged quilt," someone else may venture, but that's not entirely fair, either.

The real problem is appearance. A catfish gives breadth and definition to the term ugly. Also, catfish are thought to feed on only the most disgusting of foods, and indeed are caught on such succulent fare as chicken guts, congealed blood and other similar enticements ever so accurately called stinkbaits. Furthermore, a catfish seems to shun clean water, yet will cavort in a sewer outflow like a pornographer in a hot tub.

The image of the catfish is so thoroughly disagreeable that an outsider will invariably assume that a southerner would eat one only in order to maintain some historic stereotype. Non-natives figure we grew up eating a mixture of collards, chitterlings, catfish, grits and pig's feet anyway (and some of us did).

Yet, aside from their reputation for limited beauty, catfish have gotten a bum rap. Some species do not eat carrion, or much of it anyway, and some favor water as pristine as that found in any trout stream. And quite honestly, no fish in freshwater — including the celebrated trout or walleye — is as good to eat as a catfish. The flaky, white meat is absolutely delicious. From the first bite, you know instantly that the old saying "beauty is only skin deep" is a blatant lie.

Catfish are not only delicious, they also have a keen sense of humor. Bet you didn't know that, did you? I offer as evidence the events of an accidental catfishing trip I took last spring to the Dan River. I wanted to catch a rockfish, but after six hours and several thousand fruitless casts, it was becoming obvious that no rockfish was going to be caught.

I did, however, catch a small channel catfish and deposit it into a cooler that was empty except for a gallon milk jug of orange Kool-Aid. I settled back to fish, and was about to fall asleep when I heard the catfish swimming inside the cooler.

"Boy, those catfish sure do live a long time out of water," I remarked to my companion, Mike Gaddis.

"Yep, sure do," he replied. "Did you put water in the cooler?"

"No, I didn't," said I, at which point it suddenly occurred to me that there was nothing in that cooler for a catfish to swim in. I leapt up and flung open the top. My catfish had punctured the milk jug with a spine and was sloshing around in several inches of orange Kool-Aid, looking a bit too smug for his own good. I ate that fish a few nights later, and yes, unless my imagination was playing tricks on me, I thought I detected the faint flavor of oranges.

I don't think, however, that you'll see Julia Child cooking *Catfish L'Orange* on the tube anytime soon, but I must admit that catfish marinated in Kool-Aid is not the worst thing I ever ate.

Maybe I ought to tell Burts about that recipe. It would make the perfect fish camp dessert, and I know he would enjoy it. Those Louisiana folks will eat anything.

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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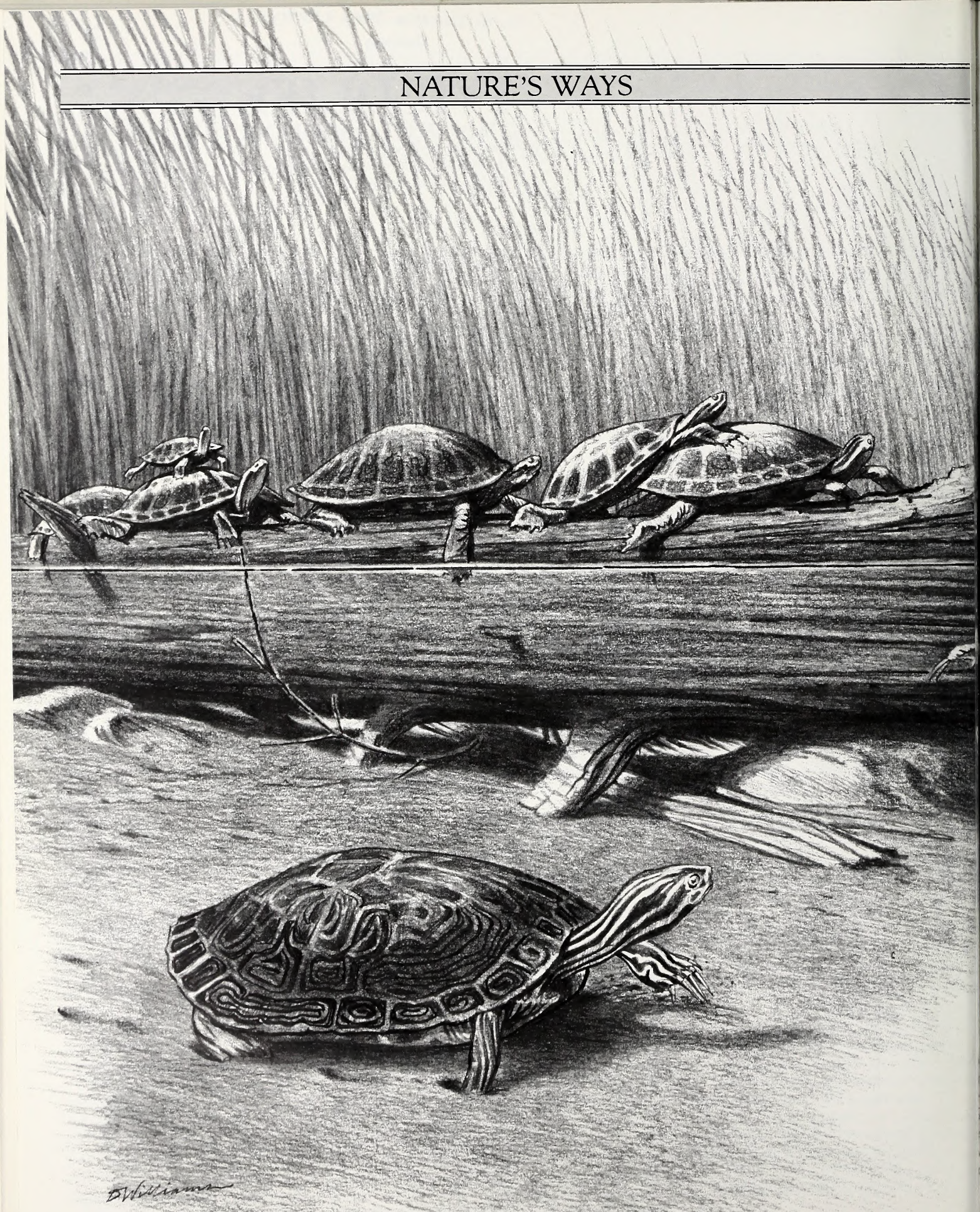
NATURE'S WAYS



Soaking Up The Rays

written by Lawrence S. Earley / illustrated by David Williams

Cooters and sliders basking in communities are common sights on eastern and Piedmont rivers, especially in spring. Basking is an important part of a turtle's daily life. Cold-blooded turtles need the sun to regulate their body temperatures. Their digestion increases as they get warmer, and their drying skin and shell causes parasites such as leeches to fall off.

Most freshwater turtles begin life as carnivores and end as herbivores. Aquatic insects are favored by young turtles because of their high calcium content, necessary for the turtles' shells. As adults, however, turtles will eat mostly aquatic plants, although they will also take tadpoles, small fish, crayfish and other creatures that opportunity presents.

For the past month or so, many of us have been taking the pulse of spring like doctors worried about the health of their patient. "How's she coming along?" we ask, frowning nervously. We scan woodland for news of dogwood and redbud, and shake our heads over the progress of winter buds on trees. We look for reassurance that spring is really here and not just toying with us.

Though no polls have been taken, very few of us measure spring by the reappearance of basking turtles on river snags. Which shows how predictably we think of spring. Basking river turtles — or cooters and sliders, as they are familiarly called — are about as reliable a sign of the season as daffodils or crocus. And unlike flowers, turtles stick around.

In the coldest weather, river turtles are nowhere to be seen. They are buried in the muck of the river bottom, their storm windows up and a low fire burning. Biologists may argue whether or not to call this inactivity hibernation, but whatever it is it's remarkable. In the cold water the turtle's metabolism slows. Ordinarily a turtle can remain underwater without breathing for an hour or two, but in cold weather its slow metabolism consumes even less oxygen, enabling it to survive without a breath for weeks or even months if necessary. Some oxygen is even taken in through the skin, and two small sacs in the anus may also absorb oxygen from the water.

But as the warm weather raises the water temperature above 50 F., the turtles leave their winter beds and become active. On a sunny day they can be found basking on a log with all the contemplative repose of a Turk at tea.

Once it leaves the muck, the turtle basks with admirable singlemindedness. It takes to the sun generally from midmorning to midafternoon. It will even crawl out on a log at night if it needs to. Indeed, the instinct is so strong that logs are sometimes packed with tiers of basking turtles, great multi-story parking garages of them, climbing over each other's backs to achieve a little piece of the sun.

It would be cheering and altogether splendid to think that a turtle basks out of a Huck Finn sense of leisurely abandon. Alas, this is not true. A basking turtle is in search of good health and hygiene, more like someone taking mineral baths than a sunbather.

When a turtle climbs onto a sunny log it is responding to the need for heat, like any human donning a sweater on a cool morning. The difference is that humans — because they are mammals and warm-blooded — want to prevent internally generated heat from escaping, while cold-blooded turtles, members of the reptile family, need an external source of heat. The sun will do quite nicely, thank you. When its body temperature is just right, the turtle will slip into the water to cool down.

But basking does more than regulate body temperature. A turtle's rate of digestion picks up markedly as it warms. And as the sun dries its shell and skin, a turtle can get rid of parasites that have become attached. By extending its front legs to the side and its rear legs behind, the turtle exposes all parts of its body to the drying action of the sun.

There are several kinds of cooters and sliders in North Carolina. The most common are the yellow-bellied slider *(Pseudemys scripta)* and the Florida cooter *(Chrysemys floridana)*. They are found chiefly in Piedmont and Coastal rivers, and often members of these species congregate on the same log.

A day in the life of a freshwater turtle is one that many of us strive for, though few achieve. A little early morning feeding is followed by hours of basking and dozing. In late afternoon the turtle eats again and then spends the night on the river bottom or floating on the surface. At this time of year a turtle's instincts are aimed at reproduction. Turtles mate in the water, and the female digs a nest for her eggs in the soft mud along the riverbank.

A life along a river — who could ask for anything more? ⊠

Bobby Buff

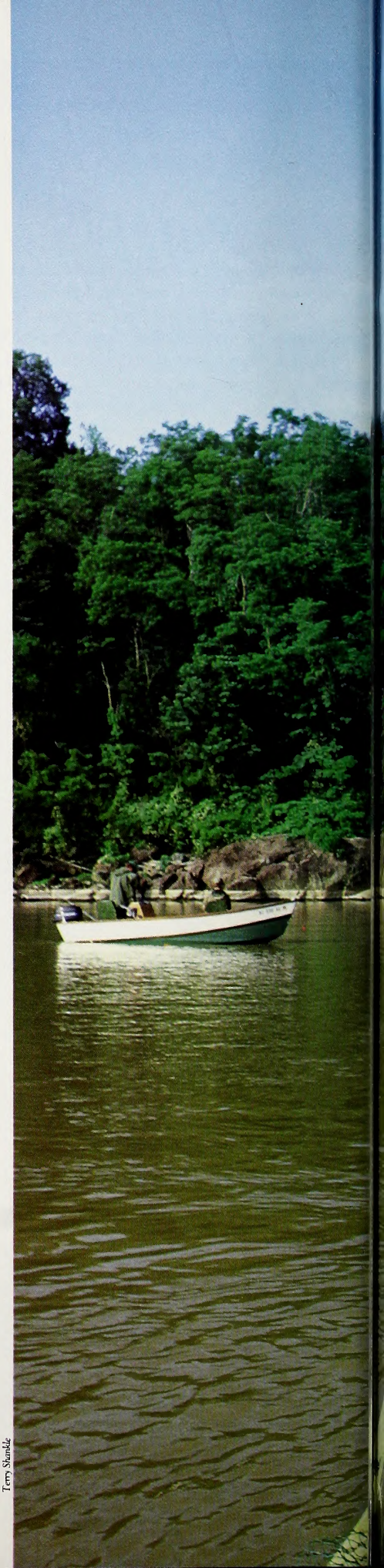
Carolina's BIG CATS

Catfishing takes on a new dimension when the fish you're seeking is a flathead that might weigh 40 pounds, or more.

by Terry Shankle

As a child living in High Point, I remember frequent Sunday afternoon trips with my Mom and Dad in the '53 Ford to visit relatives in rural Stanly County. More often than not, the conversation would turn to hunting and fishing as uncles and cousins would relate tales of deer hunting in the Uwharrie Mountains or fishing in the lakes impounded on the Yadkin River. Although I never got to go on any of those trips, I will always remember one tale in particular — a story about catfish so big you could ride them bareback.

Supposedly, these monster-sized fish had been seen by divers who were inspecting and performing maintenance on the dams that held back the Yadkin River forming Badin, Falls, Tuckertown, and High Rock lakes. Apparently, employees of Alcoa Corporation had heard of giant catfish from the divers who were hired by the company to check the four dams which were — and still are — owned by Alcoa



Terry Shankle

and used to generate power for the plant at Badin. The employees had told my relatives, and they passed on the hair-raising tale to me.

As a child I might have thought that this often-repeated story seemed incredible — and it probably was exaggerated — but when "Sea Hunt" is your favorite TV show and Lloyd Bridges is your hero, tales of catfish as big as torpedos are entirely believable.

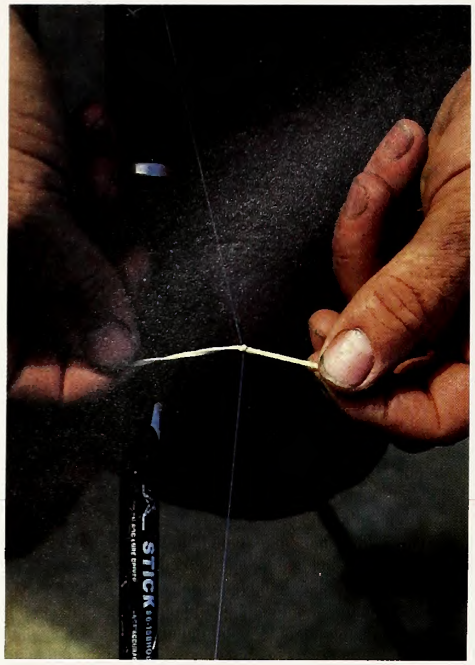
As it turns out, monster catfish actually do exist in North Carolina's waters. While they may not be as large as some caught in other parts of the country, they are big.

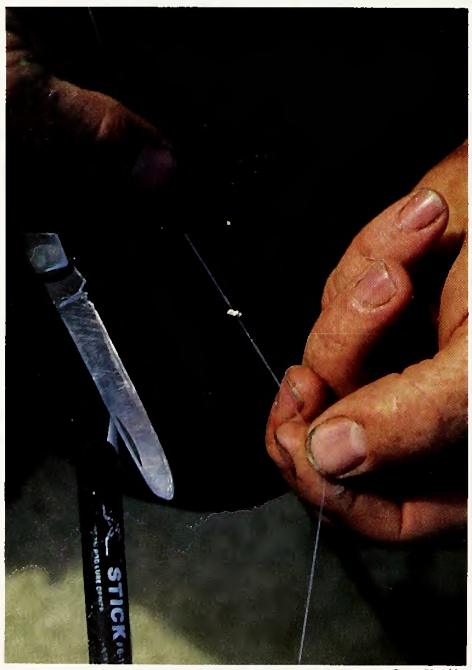
Most Tar Heel anglers are aware of the "run-of-the-mill" catfish found in our waters. Any of the rivers in the Coastal Plain hold white catfish — a good-eating fish that commonly grows to several pounds — and several species of small but delectable bullheads are found in most streams from the foothills to the sounds. But the real giants in North Carolina are two species native to the Mississippi River valley, the blue catfish and the flathead catfish. In every region of the State, there are rivers, lakes and dam tailraces that could give you a fish story to remember for the rest of your life.

The blue catfish is the unquestioned king of the river. It is the largest member of the catfish family, and tales of blue cats the size of men are common. In fact, an interesting book entitled *Steamboating Sixty-Five Years On Missouri's Rivers* by Captain William Heckman tells of a 315-pound blue catfish being caught from the Missouri River shortly after the Civil War. Is this story farfetched? Probably not. Blue catfish thrive in big, clean, fast-flowing rivers and have been hurt in this century by pollution, siltation, and construction of dams. A pure, unfettered Missouri or Mississippi river might well have produced such a fish.

Even today's blue catfish are not to be sneered at. The current International Game Fish Association's all-tackle world record blue catfish weighed 97 pounds and was caught in the Missouri River in South Dakota in 1959. North Carolina's state record blue catfish weighed 49 pounds and

A face only a mother could love — a mother flathead catfish, that is (upper left). Flatheads up to 95 pounds are reported to have been taken in North Carolina, but most run much smaller. One popular spot is the tailrace below Tuckertown Dam during the spring when flatheads gather. Matches and cigarettes fly as Bill Wallace leaps up to set the hook on a small flathead (near left).





Terry Shankle

To keep your bait a foot or two off the bottom, a rubber band is knotted to the line and the ends are trimmed so that the knot will slip through the rod guides. Slide the rubber band to the cork when the sinker is on the bottom, then slide the band down two more feet and the correct depth is automatically set until you change it.

Terry Shankle

was taken from the Neuse River in the Falls project area in 1981.

"Blue catfish are found in both the Neuse and Cape Fear river systems," said Richard Guier, supervising fisheries biologist for the mountain region. "The fish were stocked in these rivers in the 1960s. Although the fish didn't thrive, a small, reproducing population was established and an occasional blue catfish is caught. Although blue catfish are native to the Mississippi drainage, we don't think they were ever found in any numbers in our mountain rivers which flow west to the Ohio River drainage. Blue cats are big-water fish, and it's doubtful they ever moved this far up in the tributaries. However, there are reports of blue catfish in the lower French Broad River."

Flathead catfish are another story. These fish are native to western North Carolina rivers that flow to the Ohio River system, and were common before widespread siltation and pollution took their toll.

This flathead, caught in the tailrace below High Rock Dam, is considered small by most standards. Experienced fishermen frequently catch fish in the 20-to 35-pound class.

Today, there is still a fair but declining fishery for native flathead catfish in the New River in Northwestern North Carolina. The French Broad River supports a healthy population of flathead cats. In fact, a 95-pounder was taken on a trotline and a 75-pound flathead was caught on hook-and-line in the French Broad. The fishing is best downstream from Asheville. Flatheads have vanished from the silt-choked Nolichucky River, but the continued clean-up of the mining industry may bring them back. A restoration program for flathead catfish is planned for this river if water quality continues to improve. Ironically, some of the best fishing for this mountain brawler is in the Piedmont and Coastal Plain — and the outlook for flatland flatheads gets better each day.

"Adult flathead catfish were stocked in the Cape Fear River and fingerling flatheads were stocked in the Yadkin River in the mid-1960s," said Jimmy Davis of Elizabethtown, supervising fisheries biologist for the Coastal Plain. "After the fish were stocked, we didn't hear any reports of catches for a long time. We had just about written off the flathead stockings as failures when the first fish were caught in both river basins in the early 1970s."

Today, you can step into any tackle shop in the Cape Fear region and hear anglers talking catfish. The fish have expanded their range, and are now found from the Buckhorn Dam in Lee and Chatham counties downstream to Wilmington. Flathead catfish have also moved into the lower 15 miles of the Northeast Cape Fear.

"There are flathead catfish weighing 60 pounds being caught from the Cape Fear right now," said Davis. "They just aren't being entered as State record fish — that honor belongs to a 47-pound flathead catfish caught in Alarka Creek in 1981. I expect this record to continue to be broken for some time. A lot of smaller flathead catfish are caught on trotlines in the Cape Fear, but the really big fish are taken on hook and line. Most flatheads are caught from big holes — below dams and under bridges are especially good spots."

The stockings also "took" in the Yadkin River basin. The fish are found as far upstream as Idol's Dam in Forsyth County, but most of the fish are found in Badin and Tuckertown lakes. Large numbers of big flathead cats congregate in the tailraces of the Tuckertown and High Rock dams each spring. The fish move into the turbulent waters in May and June to feed and possibly to spawn, and the dams stop their upstream movement. Before the fish return to the lake, their congregations create an exciting if short-lived sport fishery.

Donnie Wallace

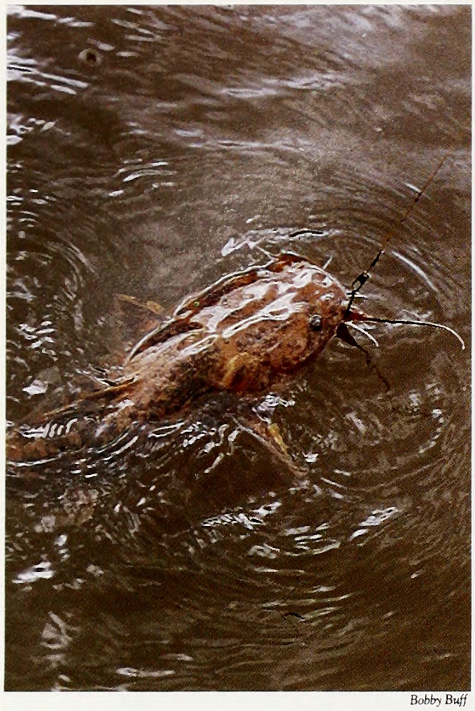
Donnie Wallace shows off a catch of big flatheads caught by him and his brother, Bill. Such catches are possible only during the short spring period, and there is no creel limit because there is no evidence that the flathead population is being harmed.

How do you catch one of these monster flatheads? The Cherokee Indians used to wrap a strip of red cloth from the palms of the hands up their forearms, then dive into a deep hole in the river where they knew a big flathead was waiting. They would thrust their arm deep into some crevice, and let the catfish inhale the bait. When the fish had consumed a fair amount of Indian, the brave would open his hand, grasp the innards of the fish, and — hopefully — wrestle the fish to the surface.

If this doesn't appeal to you, a better — and legal — way to catch catfish is on hook and line. Not long ago, I had the chance to go fishing for flathead cats with the Wallace family of Lexington. The four Wallace brothers — Donnie, Bill, David and Jimmy — along with their father Ted, have lived their entire lives in the central Piedmont, and are known as the premier flathead catfishermen on the Yadkin River.

Full of anticipation, I met the Wallaces before dawn one fine spring day at a boating-access area on Badin Lake to learn how this flathead fishing was done. On the previous weekend, the Wallaces had caught 70 flathead cats — all weighing over 10 pounds. Many of the fish were in the 20- to 35-pound class, and the largest weighed 41 1/2 pounds. Would my boyhood dreams be fulfilled?

The short trip to the Tuckertown Dam tailrace was foggy and chilly. We arrived just as the sun began to strike the top of the tremendous dam that spans the river. Despite an early start, our two boats were definitely not alone. Nearly two-dozen other boats were already fishing in the rocky waters of the tailrace, and several dozen bank fishermen lined the shore and the railed walkway behind the power house — built by Alcoa to give fishermen safer access to the turbulent water. Caution should always be used when fishing the tailrace of a hydroelectric dam. It can be especially dangerous when the normally calm waters of the river explode as the



Bobby Buff

Flatheads may not be one of nature's most handsome fish, but they are strong fighters, and are excellent eating. Unlike some other catfish, flatheads seem to prefer live bait.

dam's turbines are activated to generate power. This is often done by remote control. If you're unfamiliar with a dam, play it safe and fish away from the most turbulent water. Also, never anchor your boat from the stern only.

Donnie quickly maneuvered the boat into position. He used a depth finder to locate the deep holes that were formed by the construction of the dam and the tremendous power of flood waters surging through the flood gates.

"Good, the dam's generating power," Donnie said. "We generally have better success when the water is more turbulent, but we've also caught some nice fish when it was pretty calm back here."

Bill dropped the anchors so that the boat would be held beside — but not directly over — the hole. The depth finder showed that the water's depth dropped abruptly from 5 to 35 feet over one sharp ledge. I took a position at the bow of the boat and watched intently as Donnie and Bill quickly prepared their rigs.

"We experimented a lot when we first started fishing for the flatheads," Donnie said as he worked with a stout casting rod and reel equipped with a star drag and loaded with 20-pound test line. "We've finally perfected the system that works best for us."

He threaded the line through the center of a sliding cork and then through a 1-ounce barrel sinker. The line was then tied to a barrel swivel with an 18-24 inch length of 20-pound test nylon leader on the opposite end.

Finally, Donnie sharpened and tied on a 5/0 hook. "You've got to keep the hook sharp if you expect to get it through the tough mouth of a big flathead," he said as he stripped about 30 feet of line from the reel. Then, he reached into his shirt pocket and dug out a rubber band. That's right — a rubber band!

"You cut the rubber band once and then tightly tie it on to your line well above the sliding cork," he said. "Trim the ends of the rubber band close so that it won't drag much going through the rod guides. This little piece of rubber band is what enables us to get the bait to just the proper depth to catch flatheads."

Donnie quickly cranked in the stripped-off line, leaving the small piece of rubber buried under 30 feet of rewound monofilament.

"I need some bait." Donnie turned to brother Bill who already had one baited rig in the water and was quickly preparing a second. Bill stopped long enough to pass Donnie the live-bait basket, which held over two dozen sunfish that were 3 to 4 inches long. Reaching into the basket, Donnie grabbed a brightly colored pumpkinseed bream and carefully placed it on the large hook by hooking it behind the top dorsal fin towards the tail.

Casting just a short distance from the side of the boat, Donnie quickly fed line out by hand as it slipped through the sliding cork. When the line stopped disappearing, meaning sinker and bait were on the rocky bottom, there was the small piece of rubber band just past the rod tip.

"Now is when you adjust for the proper depth," Donnie said as he carefully slid the rubber band down the line toward the sliding cork. "You want to keep your bait about 1 to 2 feet off the bottom. You do this by sliding the rubber band just to the cork while the sinker is on the bottom. Then, slide the band down 2 feet and you're set. The sinker can only go as deep as the rubber band will allow the line to slide through the cork. As long as you keep fishing the same hole, the correct depth will always be set. Be sure to use enough weight to keep the bait down, and use a sliding cork large enough to hold up the entire rig."

As Donnie and Bill finished putting out two rigs each, I scanned the other boats looking for signs of strikes or bent rods. The fishing was slow. The sun rose quickly, and heavy jackets that had been comfortable only a little while before were being shed by many of the fishermen.

As the sun rose higher, the boats began to move around more. As I looked from boat to boat, it was apparent that strikes were few and far between, and only a couple of small flatheads had been caught. It was also very apparent that our boat, as well as the one occupied by Jimmy and Ted was constantly being watched by most of the other fishermen.

"Looks like they've moved out," Donnie exclaimed as he and Bill again raised the anchors and changed the boat's position. Moments later, Bill's rod tip dipped as he was lighting a cigarette. He quickly jumped to his feet, sending cigarettes and matches flying, and set the hook.

"A little one," Bill exclaimed as he regained his composure and slowly cranked the fish into the waiting net. "That one took the cork under while I was fooling with the cigarettes. A slip like that with a big one can lose you a rod and reel."

The flathead weighed about 10 pounds, and was quickly unhooked and tied to a rope stringer.

"If you catch several big fish, you have to tie them to the side of the boat because it's not safe to have 20- to 30-pound fish flopping around inside," said Bill as he rebaited his hook. "From the looks of things so far this morning, it doesn't look like we're going to run out of stringer space or bait."

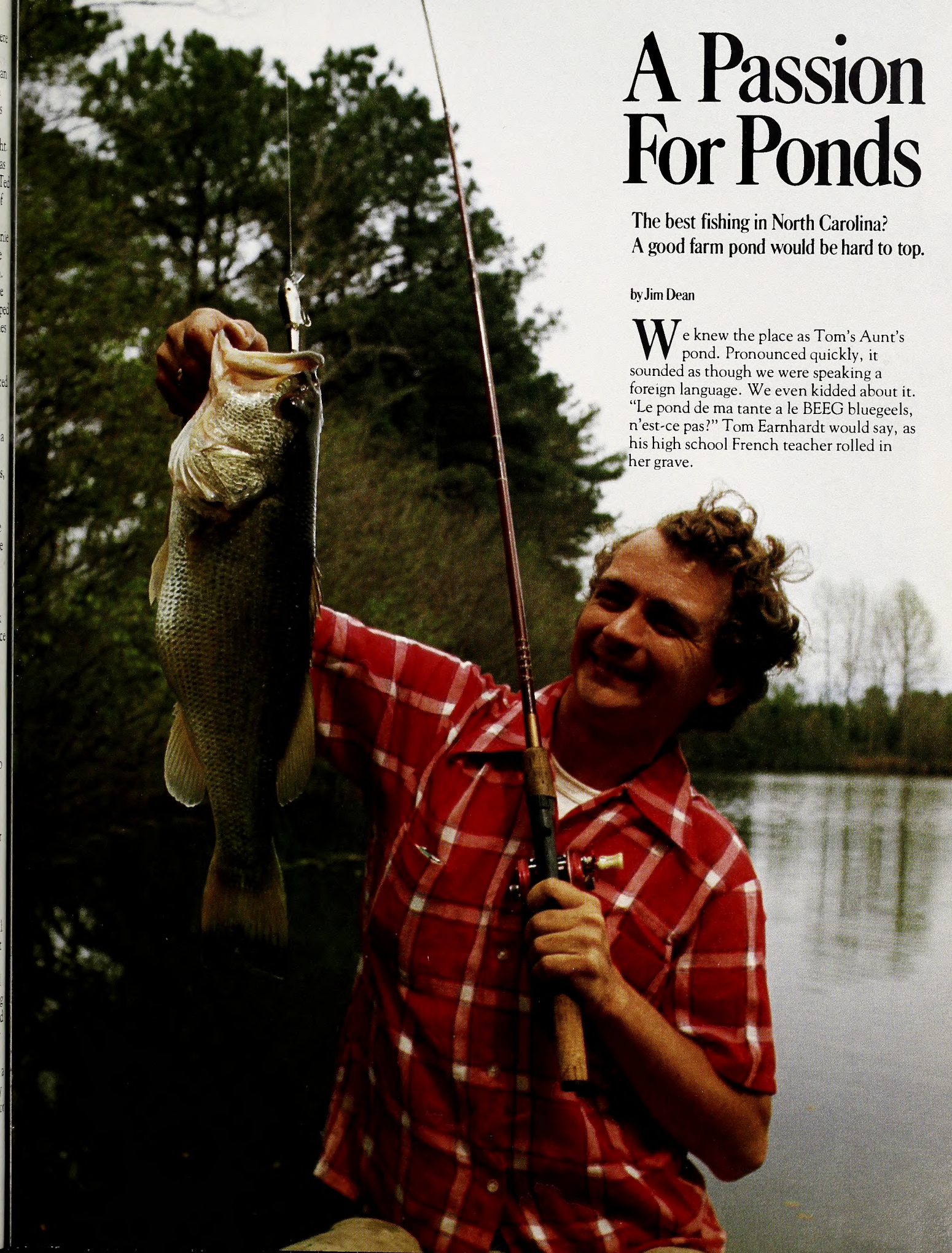
Bill's prophecy proved to be correct. The big flatheads had apparently moved out of the tailrace. The morning's catch was only four fish with Bill's 10 pounder being the largest. None of the other fishermen, including Jimmy and Ted who had left early, had much success either. Shortly after high noon on what had turned out to be a very warm spring day, Donnie and Bill pulled up the anchors for the last time and we headed back.

"That may be it for this year," Donnie said as he put away his tackle. "The run never lasts very long anyway. If it's over, this will really be a short one. Maybe we'll come back for a couple of afternoons next week just to make sure."

On the ride to the access area, I leaned back and watched the shore go by. Feeling a vague sense of disappointment, I realized that I still hadn't caught the catfish of my dreams — one big enough to ride bareback. Why, I'd probably been within a few feet of flatheads so big that even Larry Mahan himself couldn't sit astride them for the full eight seconds.

"Want to come with us next year?" Donnie asked, as we pulled into shore.

"I wouldn't miss it." ⊠



A Passion For Ponds

The best fishing in North Carolina? A good farm pond would be hard to top.

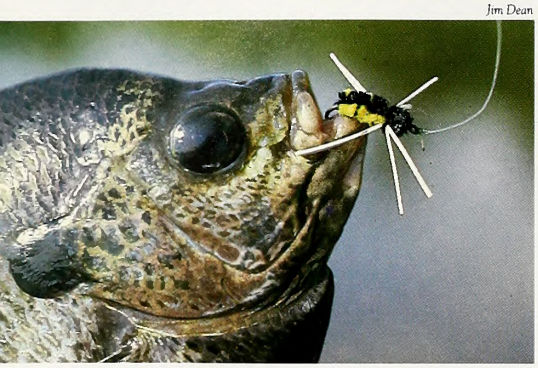
by Jim Dean

We knew the place as Tom's Aunt's pond. Pronounced quickly, it sounded as though we were speaking a foreign language. We even kidded about it. "Le pond de ma tante a le BEEG bluegeels, n'est-ce pas?" Tom Earnhardt would say, as his high school French teacher rolled in her grave.

But it was true. That pond had plenty of "beeg" bluegills, and for several years until the Neuse River flooded it briefly one spring and destroyed its delicate balance, it was a spot we could count on. Bluegills averaged 12 to 18 ounces, and at least one I saw went an honest 2 pounds. Joel Arrington caught it on a popping bug.

Several of us fished that two-acre pond

Jim Dean



regularly during the early May spawning period each year, and we had so much fun we figured we had to be committing some mortal sin. All you had to do was drop a sash weight to hold the 12-foot boat about 40 feet away from a bed of spawning bluegills, then cast small popping bugs or slow-sinking flies into the bed and hang on while a slab of bream cut circles in the water.

We also had excellent luck early each spring — usually in March and April — casting small Rapalas along the shorelines with ultra-light spinning tackle. It seemed that if there were a brisk wind and a chop on the water, you could catch bass up to 2 pounds almost as fast as you could cast.

When the Neuse backed up over the dam, it restocked the pond with everything from crappies and robin to gizzard shad and gar. Within two years, the big bluegills and most of the bass were gone, but you could catch a blue million postage-stamp crappies. Only draining and restocking would ever bring it back. C'est la vie, I guess I should say.

Losing a favorite pond is like losing a member of the family, but in this case, it's a pretty big family. In North Carolina alone, there are nearly 100,000 ponds.

It isn't hard to find ponds to fish, even good ones, yet I have the impression that many serious fishermen believe ponds are for kids or cane-pole fishermen who snooze on the banks and hope nothing bites. And true enough, ponds lack the sheer size and challenge of a large impoundment or the wildness and beauty of a river or some brackish-water hotspot.

However, for me and a lot of other fishermen, ponds have a special charm. For one thing, pond fishing is convenient. Most ponds are within 30 minutes of home, and on a spring or summer afternoon, you can get in several hours of fishing after work. Also, you don't have to carry a station wagon full of tackle, or lug a massive outboard. On most fishing trips, you probably won't spend $5 including gas, bait, drinks and a bag of snacks. You can also tailor pond fishing to fit your mood. If you're primarily out for relaxation, you can drift around with a cricket under a cork and watch the billowing clouds form clipper ships and chickens.

Of course, there are those among us who would rather catch fish than watch clouds. Indeed, the serious fisherman is likely to care little about cost, convenience or ambience as long as the fishing is good. And that brings us directly to what may seem to be a rash conclusion. Day in and day out in North Carolina, you'll find the best and most consistent fishing for bass and panfish in ponds. Not lakes. Not rivers. Not brackish-water bays and sounds, but ponds. There is some truly superb fishing in many lakes, rivers and sounds, but if your life depended upon catching a limit of 3/4-pound bluegills or shellcrackers, you'd have your best bet on a well-managed farm pond.

The same goes for largemouth bass. Lots of nice bass — and some whoppers — are caught in large lakes, rivers and sounds, but more big bass are caught in farm ponds than anywhere else in this State.

Some years back when I was writing a newspaper outdoor column, I kept a tally of the big bass that were brought in for photographs. Hardly a week passed during the fishing season that someone wouldn't haul in a hawg. Some were so whopperous that even the editor would emerge from his cubicle to gawk. Almost without exception, those lunkers came from ponds. And while some were caught by accident, others were taken by fishermen who had realized that their best bet for a wall mount was in a farm pond.

The size of the water is undoubtedly one reason some serious fishermen tend to overlook ponds as prime fishing spots. After all, the average farm pond probably averages about two acres, and only rarely will exceed 10 acres. Some fishermen have a hard time believing that big bass can be found in such small water.

Currently, one of my favorites is an ancient one and a half acre pond half choked with fallen trees, arrowroot and cattails. It's a poor panfish pond because the bluegills and shellcrackers have been stunted for decades. Somebody also stocked it with crappies years ago, and that was a mistake. And yet, each spring I can count on some excellent fishing for bass in this spot. Last year, for example, I fished it twice in one week, spending only about two hours each time in late afternoon. On the first trip, I caught seven bass up to 4 1/2 pounds on a flyrod, and virtually duplicated that result a few days later with six bass up to 5 pounds.

I know of another pond that produced half a dozen bass last spring that weighed over 6 pounds. One of those fish weighed 9 pounds, and another topped the scales at 9 1/2 pounds — the latter taken on a topwater plug. There were also quite a few smaller bass caught in that pond. All of them were released, including the 9 1/2 pounder. That's not bad fishing, and I doubt that many serious bass fishermen matched that success on large impoundments.

It isn't a lot of trouble to find such good fishing. My fishing companions and I simply ask permission to fish ponds we know about, or likely-looking spots we see while driving through the country. Only rarely are we refused permission after we promise to close gates, leave no trash and bring no one else with us on subsequent trips. Also, we always call and ask prior to each trip.

Of course, not all the ponds we sample turn out to be good ones. Indeed, only

Ponds may be a great place to teach a kid to fish, but serious fishermen ought not to pass them up. If you're looking for a stringer of fat bluegills or shellcrackers, a good pond is your best bet. Also, more huge bass are caught in ponds than in large impoundments.

Jay Davies

about half of them seem to be worth a return trip. We've also found that some of the good ponds are better suited to panfishing than bass fishing. Just don't pass up a pond because it's small. The best bluegill and shellcracker pond I've ever fished covered less than an acre, yet it produces roughly 200 panfish in the 16 to 40 ounce class every year. I don't need to tell you how much fun it is to wrestle with a 25-ounce bluegill that is darn near as big as a commode lid.

Though the actual number may change from year to year, it's a good idea to have half a dozen or more ponds you can fish. Some may be private, while others may be open to the public for a small fee. Invariably, they will all be somewhat different. Some will be large, while others are small, and some may be aesthetically pleasing, while others may be little more than bowl-shaped stock ponds. And most important, some will offer excellent panfishing, while others will be better suited for bass.

That brings up a point that's worth some elaboration. There seem to be several types of ponds. The first — and most popular — is the pond that consistently produces large bluegills and shellcrackers. Such a pond is usually well-managed (see Jay Davies' article on pond management in this issue). More than likely, a good panfish pond is also fairly new since peak fishing often begins about the fourth year after a pond is built and lasts several more years before it begins to decline. Of course, careful management can greatly extend or regenerate that peak period.

A truly hot panfish pond does not always offer excellent bass fishing, however, especially if you're seeking only lunker largemouths. A well-balanced pond that produces sizeable bluegills and shellcrackers may also produce lots of bass, but most will be in the 1- to 3-pound class. Lunker bass over 8 pounds may be fairly uncommon, although you will run across some exceptions.

The second category would include those ponds that are usually older and past their peak years. Characteristically, such ponds contain large numbers of stunted panfish, and the fishing may be quite poor most of the time. Indeed, many fishermen pass up such ponds, yet that may be a mistake if you're looking for a really big largemouth bass. Often, these old, poorly managed ponds contain a few monstrous bass that are growing old and fat feeding on all the small panfish. Such bass are usually difficult to catch, but if you fish them carefully, sooner or later you may land the fish of a lifetime.

Jay Davies

Finally, there are ponds that seem to be in some stage of transition. They may be somewhat past their prime, yet they still offer fairly good panfishing, and also hold a fairly good population of bass in a wide variety of sizes. A pond like this can be a lot of fun because you can bass fish part of the time with some reasonable hope of catching some nice fish, and you can also switch over to bait, ultra-light spinning or fly fishing and catch eating-size bluegills. Unfortunately, these transition ponds can go downhill quickly, and last year's good fishing can quickly become a memory.

To get the greatest reward from pond fishing, you not only need to have several nearby ponds to choose from, you also need to carry a variety of tackle. My basic pond-fishing gear consists of a casting rod (for bass), an ultra-light spinning outfit with 4-pound test line (for both panfish and bass), and a light flyrod for panfish. A good panfish flyrod would be a 7½ or 8-footer balanced with a No. 5 or 6 line. I frequently also carry an 8½-foot flyrod for No. 7 or 8 weight line for bass, but I suspect most fishermen would consider that optional. Many fishermen would also add a couple of cane poles for bait fishing, or substitute a standard spinning outfit for the casting rod.

Of course, it would be unkind of you to point out that carrying half a dozen different outfits is hardly traveling light. Oh well, perhaps I was wrong in suggesting that you wouldn't need a station wagon full of tackle. All I know is that if you leave one of those outfits at home, it will be the one you wish you had.

But in a way that proves the point that pond fishing offers a lot of variety and some excellent fishing that you may have been overlooking. This spring, instead of spending all your time traveling to big impoundments or distant rivers, think small. Those nearby ponds can pay big dividends. ⊠

Barry

Good fishing is no accident in most ponds. Here's what to do when your pond takes sick.

Where Are The Big Fish? Not In My Pond!

by Jay Davies

My four-year old son, Steve, and I had been planning a fishing trip for some time. The other day we stopped at our local sporting goods store and Gary, the owner and friend, knelt and shook Steve's hand, "What can I do for you?" he asked. Steve proudly piped that he wanted a fishing pole. I had prepared Gary the day before, so he handed Steve a cane pole and they started talking fishing. A few minutes later, Steve and I walked out the door, my wallet $1.25 lighter and Steve bubbling over with excitement, anxious to tell mom all about it.

I'm going to take off an afternoon from work soon and go pond fishing with Steve. I just hope we can find a pond with fish big enough to take home.

Small ponds can be great places to fish if they are properly managed. A lot of ponds are not, however. Sometimes the landowner does not allow others to fish or mistakenly believes in only harvesting a few of the large and none of the smaller fish each year. Such a philosophy usually leads to a pond that is out-of-balance. Now I do not mean that it is about to tip over, but that the ratio of bass and bream is out of whack. As a result, the fish are either too small, or they are in poor condition.

The fish population in most warm water ponds is based on a simple food chain and when any link gets kinked, it affects the whole chain. All ponds, just like lakes and reservoirs, get their energy from the sun. Larger aquatic plants around the edge and small microscopic plants called phytoplankton trap the sun's energy through a process called photosynthesis. The plants and phytoplankton use this energy and nutrients from the bottom or dissolved in the water to grow and reproduce. Small animals called benthos and zooplankton eat the plants and phytoplankton and these in turn are eaten by minnows, bream, and a few other small fish, which are eaten by largemouth bass.

Fishing in a pond is usually great the first three or four years after the pond is stocked, but this angler's utopia does not continue unless the proper balance between predator and prey is maintained. Can't bass control the bream populations? Here is where the story gets interesting.

Bream love to eat bass eggs. This is why the male bass guards the nest for a week or more, until the eggs hatch and the fry can avoid being eaten. If there are too many bream, however, they pester the male bass day in and day out — at all hours. Somewhere along the line, even the most dedicated papa bass gets frustrated and deserts the nest and that is when the bream move in. The result is that fewer bass are produced every year and before long, there are only a few bass left in the pond. Another part of the story is that, if bass are not abundant enough at the outset, bream that are too big for the bass to eat cannot be controlled by adding more bass.

Released from the control of the bass, the bream multiply and soon outstrip their food supply. Now when fish do not get enough food, they quit growing. The bream continue to reproduce, however, but they only grow to 3 or 4 inches in length, not big enough to bother heating up a frying pan.

The result is a pond with fish populations that are out of balance. How can you tell whether your pond is balanced? There are two testing methods that work. One is to fish the pond and use harvest information to tell you what you have. Another way is to use a minnow seine, 20 feet by 4 feet by 1/4-inch mesh, to sample fish populations in four or five shoreline areas. This is most effective in June and July with ponds where the bass and bluegill are two years old or older. The accompanying chart can help you interpret the results of both methods.

A common cure for an out-of-balance pond is to kill all the fish and restock, but your Wildlife Commission fishery biologist may be able to provide some alternatives. There is a simple way to help prevent your pond from going out-of-balance, however — you can fish it. "Throw it back and let it grow" just does not hold true for bream. As a matter of fact, some of the best advice is to keep every bream, no matter how big or small. If it is too little to eat, it will make great fertilizer for some tomato plant — just don't throw it back in the pond. Why not invite the neighborhood kids over to fish?

When fishing your pond, always harvest more bluegill than largemouth bass. A good rule of thumb is to take about 5 pounds of bluegill or shellcracker for each pound of largemouth. Allow the bass to spawn at least once before fishing them, and establish a 12-inch size limit on the bass. That will also help to maintain pond balance. When fishing on fertilized ponds — more about fertilization later — here are

illustrations by Jeanne Beury

some suggestions for harvesting:

1. First year of fishing: 20 pounds per acre of largemouth bass; 125 pounds per acre of bluegill and redear.
2. Second and all succeeding years: 25-30 pounds per acre of largemouth bass; 150 pounds per acre of bluegill and redear.
3. Return all largemouth less than 12 inches or those over 12 inches not planned for table use.
4. Keep all bluegill and redear sunfish regardless of their size.

Sometimes fishing is not enough to maintain balance. Excessive aquatic plants can easily upset the balance by providing too many hiding places for the tiny bream. If you can imagine trying to catch a rabbit in a brier patch, you have some idea of the problem a hungry bass encounters as he chases a bream through a submarine forest of plants. It is probably very frustrating, to say nothing of the large amount of energy the bass wastes trying to catch a tiny bite for lunch.

Understanding how plants affect a pond is one thing, but what can be done once they are in a pond and how can they be controlled? One method is to physically remove the vegetation. This usually involves raking the plants from the pond by hand — not the most enjoyable way to spend a summer day. Because raking does not remove the roots, it is not too long before the plants are poking their stems out of the bottom and stretching towards the surface.

After a couple of harvests using this method, most landowners have either thrown in the towel or are beginning to think about aquatic plant farming. If this sounds like you, don't despair — after following a few simple management tips you will be buying new fishing line and sending the kids out to dig red worms.

All aquatic plants need sunlight to live. If sunlight were prevented from reaching the plant, it would die. Water actually filters out sunlight and this is why aquatic plants only grow around the shallow edges of lakes. The deeper the water, the less sunlight reaches the bottom, and eventually plants disappear.

Designing a pond properly is the first step to controlling aquatic plants. Around most of the shore, the bottom of the pond should drop off sharply to a depth of at least 3 feet. At that depth much of the sunlight is filtered out and plants will have a difficult time establishing themselves.

Maintaining a good bloom of phytoplankton is also important in reducing sunlight and eliminating excessive plant growth. The best way to do this is to fertilize the pond during the growing season. The fertilizer provides nutrients which stimulate rapid growth of the one-celled phytoplankton, resulting in a greenish cast to the pond which shades out the plants. The abundant phytyoplankton also provide energy to the pond's ecosystem, increasing the growth and number of fish the pond can support.

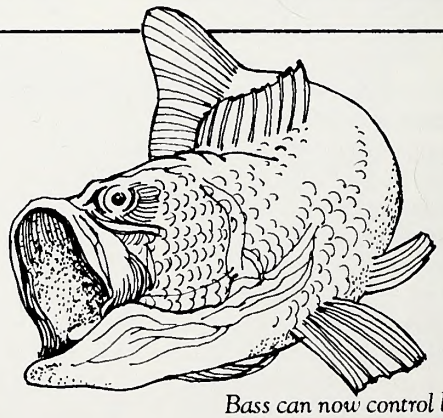
The amount and blend of fertilizer to use depend on the water quality of the pond, but usually a 20-20-5 mixture of nitrogen, phosphate and potash applied at 40-pounds per acre of pond surface works well. The initial application should be at the start of the growing season, usually early April, and periodic applications should continue through October.

It is important to use only the amount of fertilizer which is needed; too much and undesirable blue-green algae and excessive aquatic plants will be encouraged, while too little will not encourage a phytoplankton bloom rich enough to shade out the larger plants. A good rule of thumb, whenever muddy water is not a problem, is to keep the water visibility between 12 and 18 inches. If the visibility is greater than 18 inches, it is time for another application of fertilizer, but if it is less than 18 inches, wait a week or more and check again. Marking a stick at 12 and 18 inches and fastening an aluminum pie plate to the end is a handy way to measure water visibility. A simpler method is to use your arm; most elbows are approximately 18 inches from the tips of the fingers.

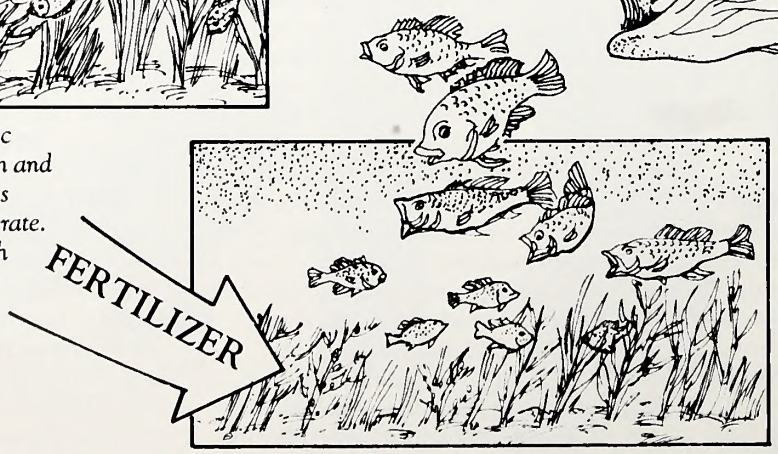
If your pond is muddy, fertilizer will only become attached to the mud particles in the water and will do little good. Clearing the pond is your first order of business, and there are several methods that work. You may add dry hay (20 bales pre acre), green

Rx for Ponds: Fertilization

Excessive growth of aquatic plants gives refuge to bream and other small fish, and allows these populations to proliferate. Result is pond teeming with small bream and few bass.



Bass can now control bream populations, reducing their numbers. With more food available, bream grow larger and bass populations increase.



Fertilizing pond encourages growth of phytoplankton on surface, which shades out much of the excessive plant growth.

hay (one ton per acre), cottonseed meal (75 pounds per acre) or superphosphate (25 pounds per acre) to the pond. After the water clears begin the fertilization program. In winter you can add barnyard manure (one ton per acre) to the pond every three weeks, or dry chicken manure (500 pounds per acre). These methods may clear the water temporarily, but for longer term results find the source of the mud and prevent it from getting into your pond.

Maintaining the proper pH or acidity of your pond's water is also important for a balanced fish life. Ponds which are too acidic will not produce much phytoplankton, and they may even be lethal to fish. A pH between 6.5 and 9.0 provides the best environment for the pond ecosystem and rapid fish growth. Have your local Soil Conservation Service agent or Wildlife Commission fisheries biologist determine the pH of your pond before beginning a fertilization program. These agents will help prescribe a treatment to correct an acidic pond. They will also talk to you about stocking your pond.

Lowering the water level of the pond from November through January is an important part of an aquatic plant control program. Exposing the roots of the plants so that they dry and freeze in winter will kill most kinds, but do not lower the water level too early or keep it down past January as this may spread the plants to other areas of the pond.

A winter draw down should reduce the surface area of the pond by no more than two-thirds. Doing so will ensure sufficient water is present in the pond to support the fish during the winter and will concentrate them, making it easier for the bass to catch the bream. This results in improved growth of both species and helps maintain the balance of the pond.

A less natural way to control aquatic plants is to use chemicals. Copper sulfate is the active ingredient in many commercial aquatic herbicides. Some of these herbicides will kill only certain kinds of aquatic vegetation so it is advisable to know the type of plants growing in the pond. As with all chemicals, caution should be exercised when using aquatic herbicides. Some herbicides are toxic to wildlife and fish may be inedible for a period of time after application of the chemicals. So read the labels before using!

Managed ponds not only provide hours of fishing, boating and swimming, but also supply water for livestock, firefighting and irrigation. Pond management is not a complicated process. Most techniques are based on simple, easily understood biological principles which are inexpensive to apply. The U.S. Soil Conservation Service has trained representatives available in each county to provide technical assistance to landowners about the design and location of ponds. Fishery biologists with the N.C. Wildlife Resources Commission are available to discuss pond management and help the landowner enjoy the full recreational potential of pond fishing. But the best thing about these professionals is they make house calls at no charge. ⊠

Testing For Pond Balance

Are your fish populations balanced to produce good pond fishing? You can find out by fishing them and keeping records, or you can take samples of the fish life by using a minnow seine in several locations along the shoreline. Use the following guide to interpret your results.

Angler Method

Harvest Data	Population Condition
1. **Bluegill** 6 inches and larger. **Bass** average from 1 to 2 pounds although smaller or larger sizes are also caught.	Desirable fish population (balanced).
2. **Bluegill** average in excess of a third of a pound. **Bass** average less than 1 pound and are in poor condition.	Undesirable population with bass overcrowded.
3. Principally small **bluegill** of 3 to 5 inches in size. Very few **bass** are caught and when caught are larger than 2 pounds in size.	Undesirable populations with bluegill overcrowded.
4. Small crappie, sunfish, bullheads, carp, suckers or other undesirable fish of any size.	Undesirable fish population.

Seine Method

1. No young bass present; many recently hatched bluegill; none or few 3 to 5 inch bluegill.	Undesirable fish population with bass crowded.
2. No young bass present. No recently hatched bluegill. Many 3 to 5 inch bluegill.	Undesirable population with bluegill overcrowded.
3. No young bass present. No recently hatched bluegill. Many 3 to 5 inch bluegill. Many tadpoles, minnows or crayfish.	Undesirable population with bluegill overcrowded. Very few bass in pond.
4. No young bass present. No recent hatch of bluegill. Few 3 to 5 inch bluegill.	Undesirable fish population. Crowding due to other fish competing with bluegill.
5. No young bass present. Few 3 to 5 inch bluegill. No recent hatch of bluegill. Many 3 to 5 inch green sunfish.	Undesirable fish population with overcrowding due to green sunfish.
6. Young bass present. Many recently hatched bluegill. Few 3 to 5 inch bluegill.	*Desirable fish population.*
7. Young bass present. No recent hatch of bluegill. No 3 to 5 inch bluegill.	Undesirable fish population. Bluegill absent.
8. Young bass present. No recent hatch of bluegill. Few 3 to 5 inch bluegill.	*Temporary desirable population.* Bluegill may have competition.

Magnificent MONARCHS

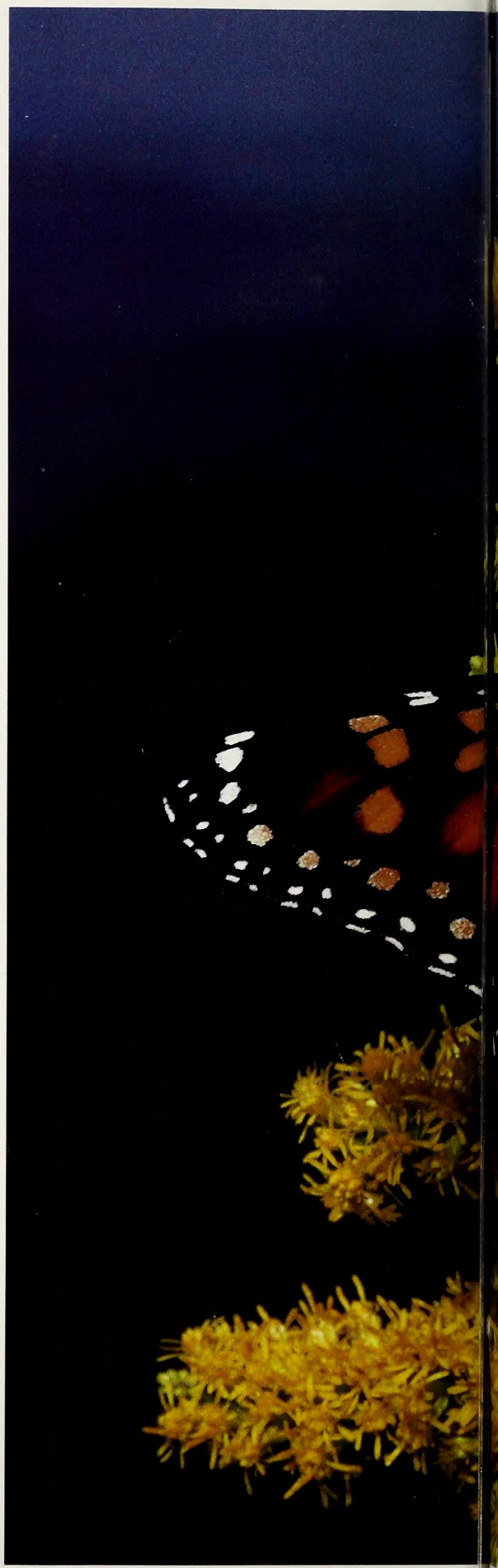
Each year, Monarch butterflies pass through North Carolina on incredible migrations that range from Mexico to Canada and back.

written and photographed by Harry Ellis

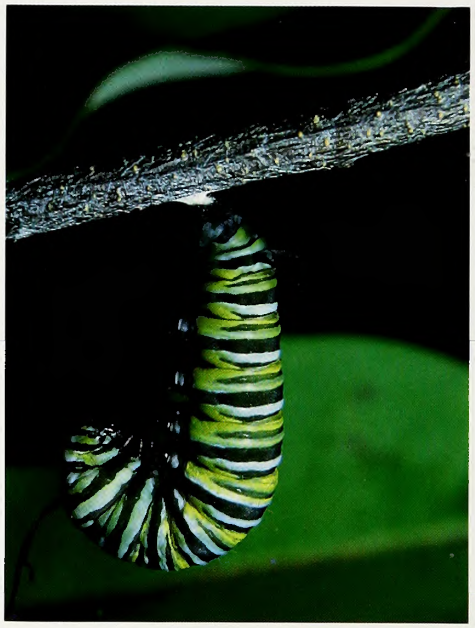
Since ancient times, man has observed with awe and fascination the seasonal movements of the big orange-and-black monarch butterflies, the only ones that annually migrate both north and south like birds. He has watched the flocks move southward in autumn, wondering how such delicate wind-tossed creatures were able to find their way over long distances and, after the howling gales of winter had passed, return again northward to the flower-filled fields of spring.

The monarch *(Danaus plexippus)* is known and recognized by more people than any other American butterfly. Hundreds of bright-eyed school children know it by sight and are able to call it by name. It flits in summer over fields, gardens, and meadows throughout the whole United States — with the exception of the Rocky Mountains and the far western deserts — and well into Canada.

The most widespread of all our butterflies, it is also one of the most numerous. At a time when some 30 species of our American butterflies have rapidly declined during the past decade, and some of them may soon be placed on the Endangered Species List, it is heartening to know that the monarch is as abundant as ever.



The incredible journey of the monarch butterfly is interrupted as the colorful insect sips nectar from a goldenrod plant in the Blue Ridge Mountains. The monarch flies from Canada to Mexico where it winters with millions of its kind in a 20-acre plot. The life history of the monarch begins with the pearl-like egg, (above), which is laid on the underside of a milkweed leaf in spring.



Two stages in a monarch's life

When the monarch egg hatches, a tiny, greenish caterpillar with a shiny, black head crawls out (top left). This is the first step in the metamorphosis of a monarch butterfly. After two weeks of molting, it is a boldly striped, full-grown caterpillar about to change once again. Attaching itself to a twig, the caterpillar splits its skin between the eyes and the green chrysalis bulges forth. When the old caterpillar skin drops off, the new chrysalis is seen in all its beauty (facing page).

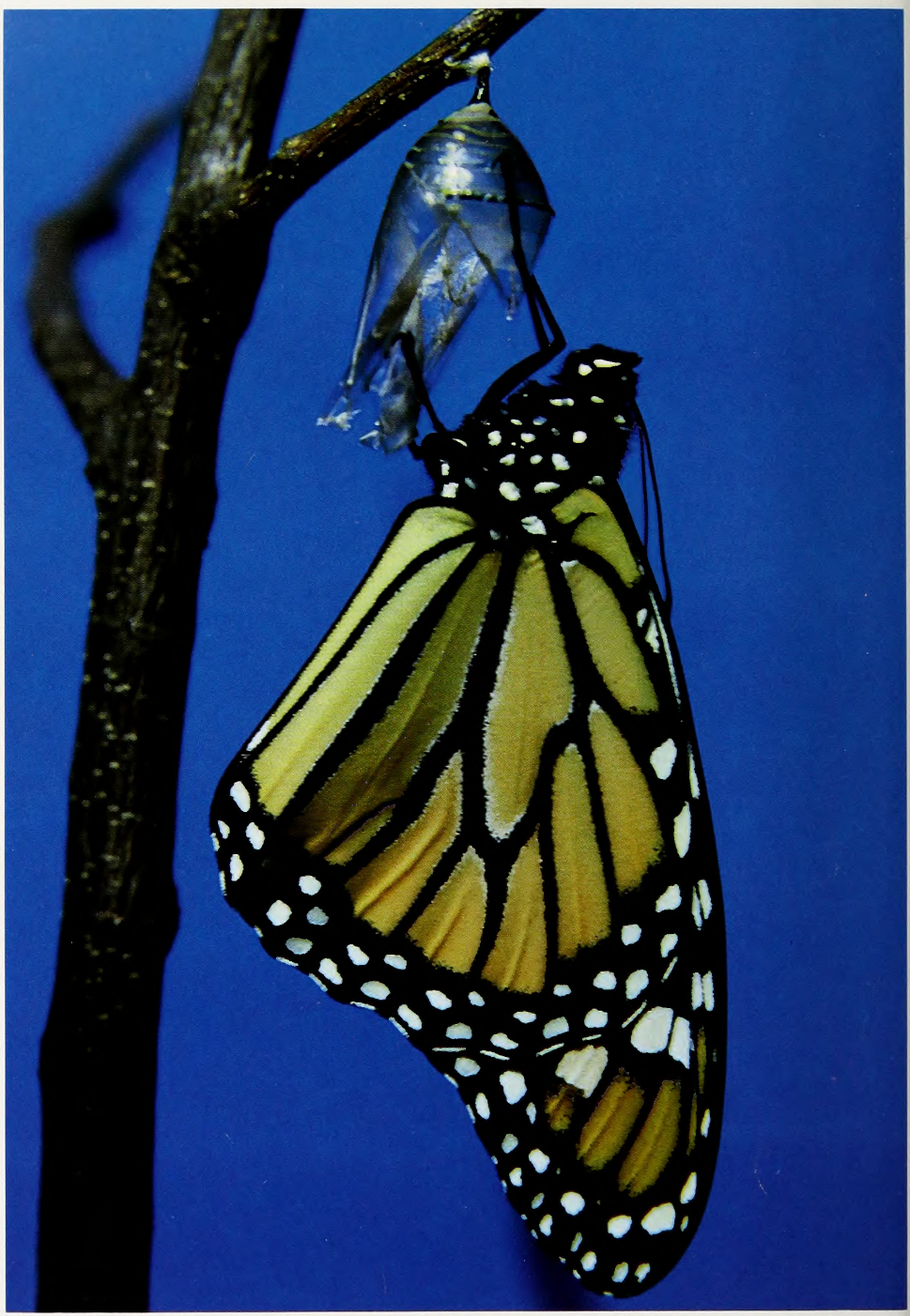
With the passing of winter, the monarch follows the spring northward. Descending to young, tender milkweed plants, the female lays her eggs singly, here and there, until she has laid a total of 400 or more. Each pale-green, bullet-shaped egg, intricately ribbed and so small that the naked eye can hardly see it, is glued to the underside of a milkweed leaf. Not many days afterward, both male and female monarchs, exhausted from their efforts, fall to the ground and fly no more. But the northward migration has not ended. There is only a pause, as a new generation matures and prepares to resume the journey.

In a week or 10 days, a tiny, black-headed greenish caterpillar hatches from the egg, with an intense craving for milkweed leaves — its only aim in life to eat and grow. Shedding its skin from time to time, its size increases with each successive moult, until in two weeks time, it is a large, boldly marked caterpillar with stripes of yellow, green, and black, nothing about it remotely resembling a butterfly. Now a full-grown caterpillar, it soon stops eating, grows restless, and leaves the milkweed plant searching for a proper place to enter the pupal or chrysalis stage of its life. Finding a suitable twig, it attaches itself, hanging head downward. Within hours, a kind of convulsion seizes it and the body begins to contract and expand, causing the skin to split between the eyes. The split progresses upward along the median line of the back, and finally the green chrysalis bulges forth.

Where a moment ago there was only a caterpillar, we now see a brilliant, jade-green cask, bejeweled with a row of shining gold dots half encircling the chrysalis, and hanging by a thin black stem. One of the most beautiful objects in nature, it has been called the "the green house with the golden nails." But in 10 days or so, the green and gold vanishes and the walls become transparent, revealing the developing orange-and-black wings of the monarch butterfly. The miracle of transformation to a winged beauty is now near at hand.

Suddenly, without warning, the chrysalis is rent at the bottom and the butterfly bursts out and hangs to its fractured walls. The flame-colored wings, crumpled at first, gradually expand and become straight and its swollen abdomen becomes more slender. Then, unexpectedly, with a contraction of the body like the first breath of an infant, the monarch sails away — into blue skies and green fields.

Such a radical change from a crawling caterpillar to a brilliant butterfly recalls to mind the old fairy tales where an enchanter waved a wand and a man becomes a beast or a beast becomes a man. In the case of monarch metamorphosis, however, nothing could be further from the truth, for we know that such change comes only through a series of unerring steps, following the specifications of "nature's blueprint."



The spring migration is now resumed, the new generation driven northward by an inborn instinct. They, too, after traveling hundreds of miles, mate, lay eggs, and with tattered wings beating feebly, also soon die. The eggs hatch and the larvae mature into adult butterflies that continue the journey, each successive brood penetrating farther north until they cross the border into Canada, reaching as far as Hudson Bay before the summer ends. These monarchs also mate and produce the year's final generation of monarch butterflies.

But now in this northern latitude summer is coming to an end. There is a biting chill in the air at night as the year's energies begin to wane. Nectar-producing flowers are becoming less numerous. In these late-maturing butterflies, there is a reversal of the migratory urge. It is no longer northward, but southward. The monarch hordes are now gathering for one of the most astounding migrations in the animal kingdom. They will be traveling to a land that they have never seen, guided by an unfathomable instinct.

Much information about the monarch's comings and goings has been acquired by Canadian Zoologist Dr. Fred A. Urguhart and others under his supervision, through tagging many thousands of their wings with thin, paper adhesive labels bearing a number and an address. One monarch, tagged and released north of Lake Ontario on September 18, was recaptured in Mexico on January 25, some 1,870 miles away. Another, after being tagged, flew 80 miles in one day.

Soon the southbound migrants can be seen flying against a vast expanse of blue sky, some in large flocks resembling sunset-colored clouds, others not traveling in flocks at all, but journeying singly as lone individual voyagers. They wing their way over forests and mountains, lakes and rivers, cities and deserts, others of their kind joining them along the way.

Down across the Appalachians they come, pouring through North Carolina's Blue Ridge Mountain gaps like chips passing on a swift stream. Traveling the same migration routes that their forebears have used for centuries, it is as if, in some mysterious way, each monarch, though it has never made the flight before, somehow "remembers" that its ancestors went down a certain Blue Ridge Valley or flew over a particular chain of mountains on the way south.

Always migrating during the daytime hours, they rest at night in trees, chilled and sluggish, but when the morning sun has warmed them, they are off again. Occasionally they pause briefly in meadows along their flyways to sip nectar from goldenrods, asters and other late-blooming wildflowers.

Violent windstorms and heavy rains take a toll of migrating monarchs. Otherwise they have few enemies. Both the caterpillars and adult butterflies are distasteful and probably poisonous to birds, and most animals. As a result, they are rarely attacked by predators, which recognize them by their "warning coloration." Birds have learned so well to shun them, that another butterfly, the viceroy *(Limentitis archippus)*, with wings that mimic the color and pattern of the monarch, but lacking the bad taste and toxic characteristics, flies through the air safe from attack."

As the autumn chill advances and a whisper of approaching winter is in the air, the flights become more hurried. Their flight path is from northeast to southwest across the United States, most of the flocks passing through Texas and on across the Mexican border.

There are two distinct monarch populations in the United States — one in the eastern and midwestern states and the other in the western states. The western monarchs winter along the central and southern coast of California in groups of cypress, pine, and eucalyptus trees in congregations numbering many millions of butterflies.

After crossing Texas and the Mexican border, the eastern monarchs, which we have been following, wing their way deeper into Mexico. Here, at an elevation of 9,000 feet, they descend like swirling autumn leaves and blanket the fir trees on a 20-acre area in masses so dense that twigs and branches bow and sometimes break under their weight, though each butterfly weighs but a hundredth of an ounce.

On fragile wings they have come, from half a continent away, to this distant pinpoint on the map of Mexico. Guided by instinct, that most marvelous compass of all, they have reached their winter home at last. At this high elevation, the winter temperature stays around freezing, keeping them in a semi-torpid state in which they use up little of the reserve energy and body fat that will be needed for the return migration.

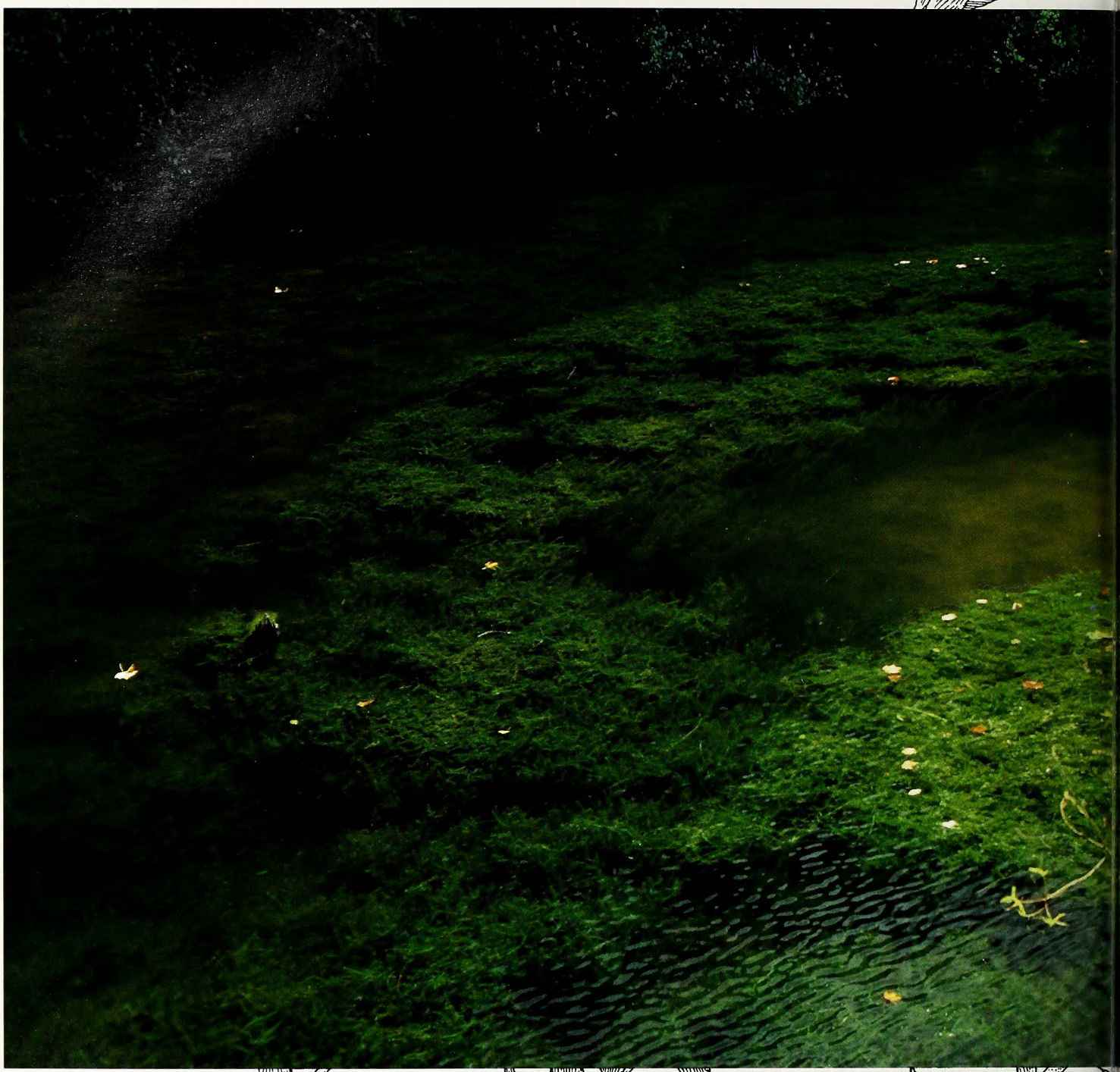
As the months pass, eventually winter begins to loosen its grip and the daylight hours grow longer. One by one, the hills and meadows to the North are touched by the green fingers of spring.

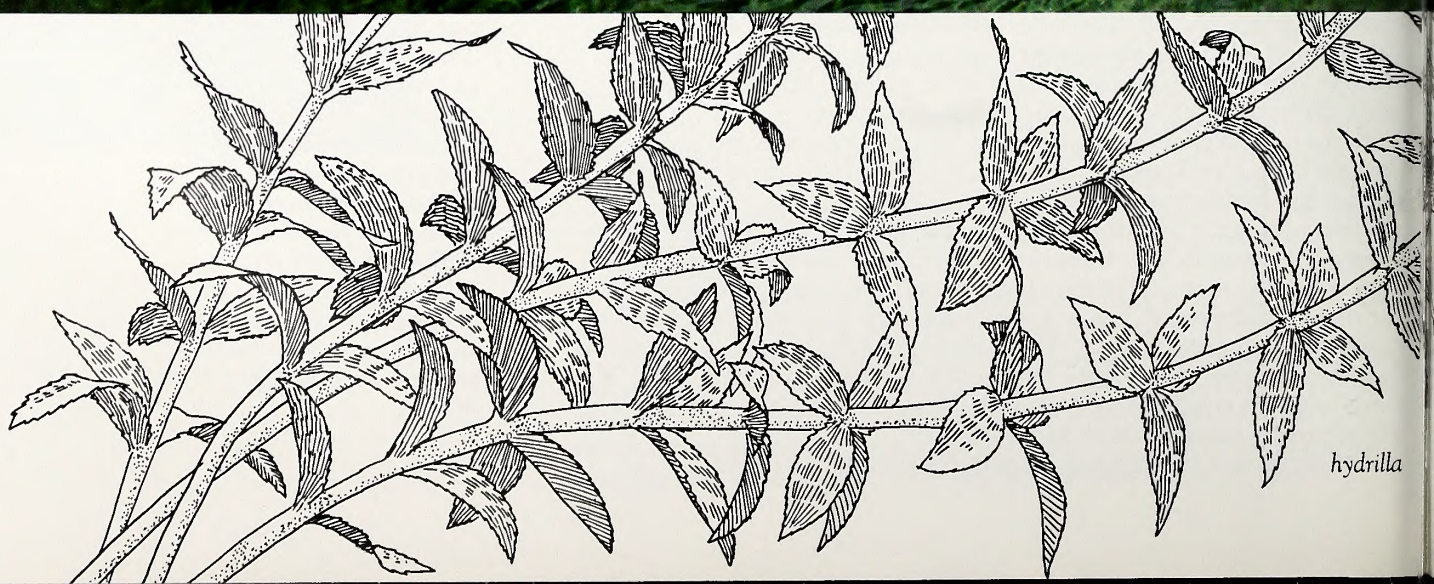
Here, high in the Sierra Madre, the monarchs stir a little, flash their wings, and engage in short flights away from their wintering trees and then back again. But soon, in the increasing warmth of a certain spring day, hundreds of them are off, winging northward, with the rest of their tribe soon to follow. On the spring flight, they travel as individuals, with no inclination to gather in flocks. Over forests, farmlands and meadows they fly, until in the fields below are clusters of fresh, green milkweed plants. Here eggs will be placed and another generation will begin anew.

The life cycle of the monarch butterfly has come full circle. ⊠

Gold-studded chrysalis yields regal monarch

Within minutes, the chrysalis changes into a jade-green case half-encircled with golden dots (top left, facing page). In 10 days, a developing butterfly is visible within the thin walls of the chrysalis (bottom left). Finally the case bursts and the fully developed butterfly emerges, hanging from its old case for a while before flying. The adult monarch (above) will continue the migration northward, driven only by instinct. After mating and laying eggs again, it will die. Successive generations push farther north until the last brood reaches as far as Hudson Bay before the summer ends. The last generation of monarchs will make the entire 2,000-mile journey from Canada to Mexico.





hydrilla

Ken Taylor

Sycamore Lake in Umstead State Park is one of 13 lakes in Wake County infested with hydrilla. This exotic weed forms dense mats which choke waterways, reduce growth rates in fish populations, impede fishing, boating and swimming, and clog intakes for water supplies and irrigation. Although the weed is difficult to eradicate, officials hope to control existing hydrilla infestations and prevent their spread to other waters.

The Deadly SEVEN

These aquatic plants threaten some of our most productive waters.

by Mark Taylor

The clear waters of Lake Anne, a small lake just west of Raleigh, looked like a giant aquarium. Thick mats of luxurious, bright green vegetation filled a small marsh at the head of the lake, and formed a thick belt around the shoreline. Some freshly cut plant stems indicated that muskrats were at work in the marsh, and small bluegills darted in and out of the shelter provided by their aquatic jungle.

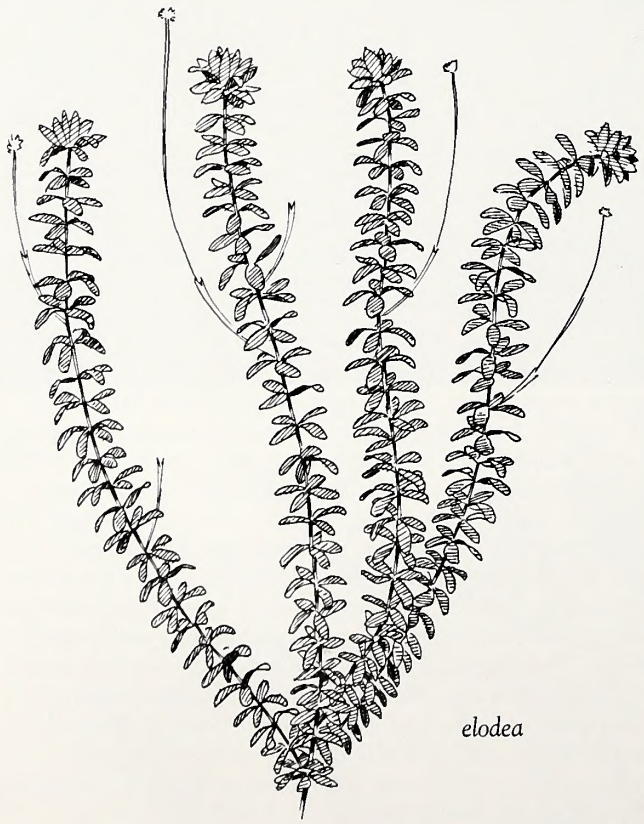
The comparison of Lake Anne to an aquarium — or a jungle! — is not an idle one. The vegetation that fills Lake Anne is hydrilla, an exotic aquatic weed native to Africa and probably introduced to the United States by the aquarium trade. Despite its attractive appearance, hydrilla poses a serious threat to the waters of North Carolina.

It is not the only threat, either. In our public waters, there are many obnoxious aquatic weeds that vex anglers, farmers and others. Hydrilla is the most publicized of the group, but six others — alligatorweed, bladderwort, elodea, filamentous algae, pondweeds and proliferating spikerush — are prevalent and extremely troublesome.

"Hydrilla has been found in 13 lakes in Wake County since it was first recognized in North Carolina in 1980," said Dave DeMont, a fisheries specialist with the Agricultural Extension Service of N.C. State University. "For years, everyone thought it was elodea, which is very similar in appearance. In 1980, it was positively identified as hydrilla. Based on experiences in other states, we feel that hydrilla could cause serious problems here."

Hydrilla infestations have severe consequences. A single fragment of a hydrilla plant can quickly multiply into a tangled mass of weeds covering acres. Navigation in heavily infested areas becomes impossible because boat props and intakes are clogged with weeds. The plant also endangers swimmers and water skiers. Several drownings in Florida have been caused by swimmers or skiers becoming entangled in hydrilla. Fishermen are affected, too. As waters become choked with the weed, anglers find it impossible to fish. Hydrilla may cause fish populations to undergo changes. Forage fish find abundant cover, and game fish are unable to prey on them effectively. Eventually, forage fish

spike rush



elodea

populations may boom and the fish may become stunted, while game fish — unable to hunt effectively — decline in numbers.

In addition, hydrilla poses special problems for farmers. In California and Florida, the plant has clogged miles of irrigation ditches. Acting like a giant sponge and impeding flows, available water may be reduced by 40 to 60 percent. A similar situation occurs in municipal water supplies and cooling lakes for power plants where hydrilla often clogs water intakes.

Florida probably offers the best example of hydrilla damage. In the late 1950s hydrilla was being imported to Florida by the aquarium industry and was sold to the public under the names of "star vine" and "oxygen plant." In 1960, a few plants were found in a canal near Miami and in the Crystal River on the Gulf Coast. Today, hydrilla infests 48,000 acres of public waters in Florida, and is also found in all of the other southeastern states and in California. Growth rates, and the rapid spread of hydrilla, are phenomenal. In Rodman Reservoir in northern Florida, for example, hydrilla covered two acres in 1971; four years later, there were nearly 3,000 acres of it!

"The hydrilla infestations in North Carolina which pose the most problems are in lakes Wheeler and Raleigh," said DeMont. "Both of these lakes serve as water supplies for the City of Raleigh, and about half of their 500 acres are infested with hydrilla. The weed is also found in three lakes in Umstead State Park near Raleigh, and the rest of the infestation sites are small, private ponds. Fortunately, hydrilla hasn't spread from these sites to other nearby waters, and we are attempting to control it."

Botanists believe that hydrilla evolved in the harsh climate of central Africa where the plant adapted to heavy floods, prolonged droughts, and extremes of temperature. This ability to adapt to widely differing conditions is one reason why hydrilla has been so successful. Another reason is its explosive growth rate, and the ability to reproduce in several different ways throughout its life cycle.

"In North Carolina, hydrilla acts like an annual plant," said DeMont. "In early spring, hydrilla plants send rhizomes — which are similar to roots — into the soil at the bottoms of waterways. These rhizomes form tubers which may be buried up to 6 inches in the mud, and lie dormant for years before sprouting. After the rhizomes have grown, the plant sends a single stem towards the surface. When this stem reaches the surface, it branches out and grows profusely, forming thick, tangled mats of vegetation. If a single piece of vegetation bearing a whorl of leaves breaks loose, it may send a root to the bottom and establish a new colony of plants. This is called 'fragmentation.' "

Still another way the hydrilla reproduces is by means of a bud. "Shortly after the mats of hydrilla form," said DeMont, "turions — which are also called winter buds — develop in the leaves. In late fall, the mats of vegetation break loose and drift. The turions mature, break off, and sink to the bottom. These turions lie dormant until the following spring when they may sprout to form new colonies."

"Controlling a plant that spreads so easily and in so many ways is understandably difficult," DeMont said. "Mechanical harvesters are sometimes used to clear boat lanes in heavily infested waters, but new plants can still sprout from the rhizomes and tubers on the bottom, and harvesting also increases the spread of hydrilla through fragmentation. Draw-downs and herbicides can also be used to kill the mats of vegetation, but they don't affect the tubers."

Despite hydrilla's success, DeMont believes that it can be controlled in North Carolina. "The most important step is to educate the public to prevent the spread of hydrilla to new waters. Herbicides may yet be another answer. A new herbicide

Ken Langeland

Sago pondweed is native to the western United States, and was probably introduced to the East. The plant is not only found in fresh water, but also thrives in brackish waters — such as this ditch on Bald Head Island. Although Sago pondweed is a nuisance, it also produced fruits, tubers and roots eagerly sought by waterfowl.

called Sonar has been developed that shows great promise. This herbicide translocates rapidly throughout the plant, but kills it very slowly. Preliminary tests have shown that Sonar may kill the tubers. Of course, herbicides can't be used at certain times in irrigation waters because of damage to crops, and many of them can't be used in drinking water supplies."

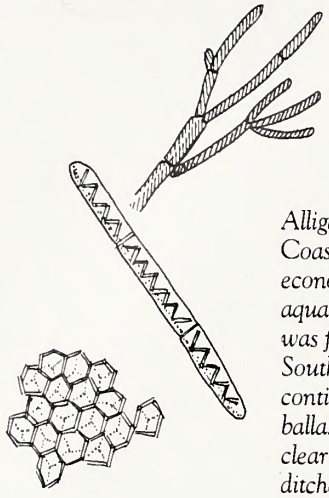
Biological control of hydrilla, while controversial, is another promising antidote. Two species of fish, the tilapia and the white amur, commonly known as the grass carp, have been used to control hydrilla in other states. Tilapia are small, tropical, perch-like fish that eat aquatic vegetation. Their success on hydrilla has been mixed. These fish cannot survive North Carolina winters, and heavy stockings are needed. No one doubts the effects of grass carp on hydrilla. Grass carp reach weights of 70 pounds, and can eat two to three times their own weight in aquatic vegetation daily. In their native Asia, they are considered fine food and sport fish. When they were first introduced into the Mississippi River drainage to control aquatic weeds, biologists did not think they could reproduce. They were wrong. Grass carp are now found throughout the southern Mississippi drainage, and are extending their range.

The problem with using carp to control hydrilla has been that the carp have been too successful. Biologists fear that grass carp may harm native fishes and waterfowl by destroying desirable aquatic plants.

"The use of grass carp does pose some problems," said Fred Harris, assistant chief of the Division of Inland Fisheries of the N.C. Wildlife Resources Commission. "These fish eat a lot of vegetation, but after the nuisance vegetation is removed they continue to eat — eliminating habitat for game fish and waterfowl. The experimental development of a sterile grass carp, however, shows promise. These fish can be stocked at rates needed to control a weed problem, but will not reproduce.

"Unfortunately, the sterile grass carp has not yet been perfected. The fish being bred have over a 95 percent sterility rate, but some of the remaining fish may be able to reproduce. There is also no easy way to tell which fish are sterile. Currently,

pondweed



filamentous algae

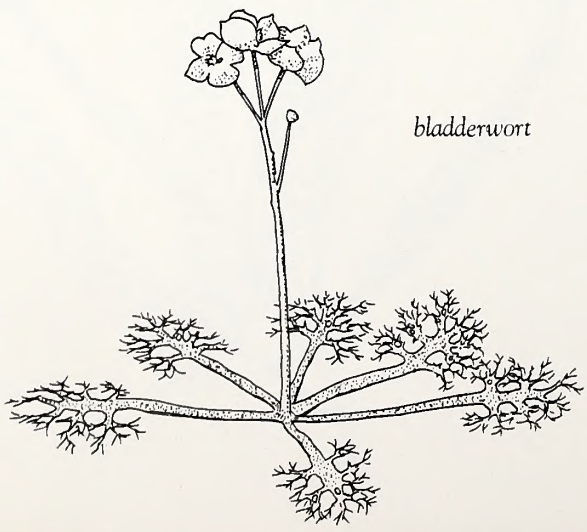
Alligatorweed is found throughout the Coastal Plain, and causes more economic damage than any other aquatic weed in the State. The plant was first introduced to this country from South America in the late 1800s, and continued to enter the country in the ballast of ships. Frustrated farmers who clear alligatorweed from their irrigation ditches and dump the spoil on the banks soon find they have a more serious problem on their hands. Alligatorweed can grow on land as well as water, and quickly chokes out soybeans and other agricultural crops in neighboring fields.

we're not taking any action on grass carp. We have experimented with grass carp in small ponds which are closed systems and offer little opportunity for the fish to escape. The perfection of a hatchery-bred, sterile grass carp would be a great boon to aquatic weed control."

Of the other aquatic weeds that choke the State's waterways, many are also exotics. One of these, a plant called alligatorweed, has received less publicity than hydrilla, but is probably the most serious aquatic-weed problem in North Carolina.

"Alligatorweed is a double threat — it causes problems on both land and water," said Ken Langeland, an assistant professor in the Weed Science Department at N.C. State University. "This weed is native to South America, and was brought to the United States in the late 1800s. Currently, alligatorweed infests thousands of acres throughout the Coastal Plain, and is found west to Johnston and Vance counties. Alligatorweed grows in dense mats, and may completely choke irrigation ditches. Like other aquatic weeds, it can spread by fragmentation — a single portion of a plant can establish a new colony. If alligatorweed is removed from ditches and dumped on the ditch banks, it quickly spreads by cultivation into nearby fields. Once it has become established on land, it is almost impossible to control. Commercial crops, especially

Neil Rhodes



bladderwort

soybeans, can't be grown economically in fields which are infested with alligatorweed."

Langeland says that farmers who have serious problems with alligatorweed should treat the plant with herbicides, but should not remove the vegetation from ditches. Herbicides provide temporary control by killing the vegetation, but they do not eradicate the plants.

"Currently, there is no really effective control for alligatorweed," he said. "Some biological controls are being tested in Florida that may help. Three insects which are native to Argentina and eat only alligatorweed are being studied. These insects may provide a solution, although we don't know how well they will fare this far north."

Perhaps our most unique aquatic weed is bladderwort. This weed is found statewide, and is native to North Carolina. Like other aquatic weeds, it can quickly choke a waterway.

The unique feature of the carnivorous bladderworts is the small "bladders" attached to stems which are used to catch insects, aquatic invertebrates, and even small fish fry. These bladders are fringed with tiny bristles, and when an insect brushes against one the bladder opens and water rushes in and drowns the trapped prey. No enzymes are secreted by the plant, but nutrients are obtained as the insect decays.

"The best control for bladderwort is to stock tilapia, and a permit is required for this," said Langeland. "In fact, Carolina Power and Light Company has used tilapia to control bladderwort near one of their power plants on Catfish Lake near Wilmington. Herbicides also offer temporary relief."

The other aquatic weeds which cause problems in Tar Heel waters include elodea, filamentous algae, pondweeds, and proliferating spikerush.

Elodea looks very much like hydrilla, and causes many of the same problems. It grows quickly, and forms dense mats which soon cover large areas. Unlike hydrilla, however, elodea doesn't produce tubers and can be effectively controlled with herbicides. Tilapia have also been used to control elodea.

Proliferating spikerush causes problems in ponds. This attractive, grass-like plant often grows on the banks of ponds, and spreads into the water. Eventually, the plant may grow in water up to 8 feet in depth. It is found throughout the State, and there is no real control although herbicides work temporarily.

Anyone who fishes Tar Heel ponds is also familiar with filamentous algae and pondweeds. Filamentous algae are the long, green algal strands which wrap around fishing line and obscure lures. Pondweeds have small, submerged, ribbon-like leaves, and the rooted plants can fill a small pond. Both can be effectively controlled with herbicides.

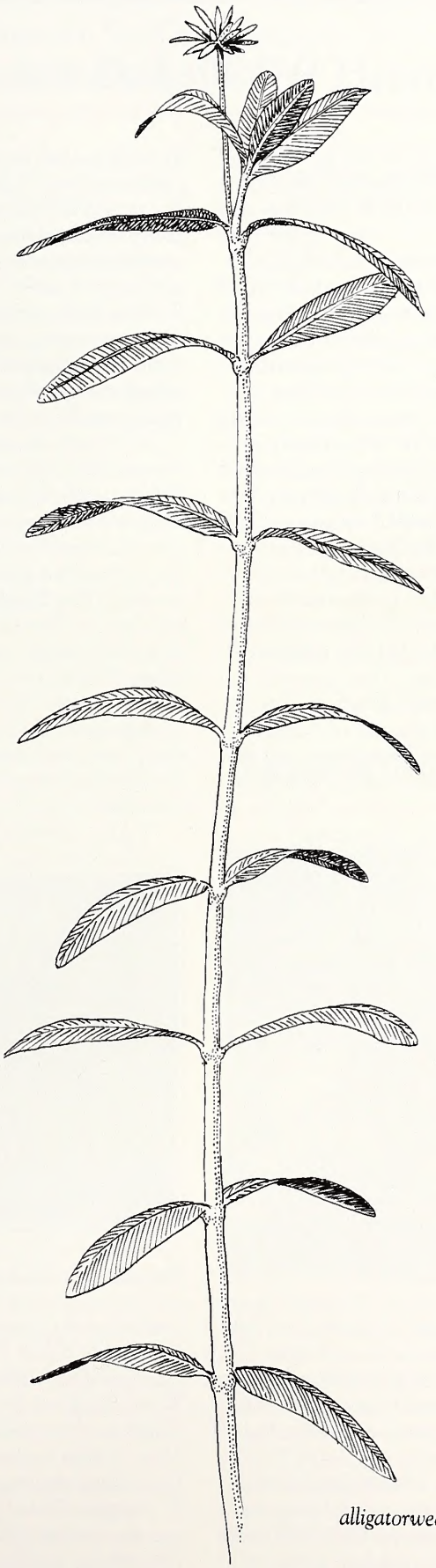
What should a landowner do if he has a problem with aquatic weeds? The first steps are to identify the weeds, and determine if they really are a problem.

"Many aquatic plants, especially native plants like eelgrass and pickerelweed, are beneficial to fish and wildlife," said Harris. "Aquatic plants offer food and shelter to aquatic insects and invertebrates, forage fish, and game fish. Waterfowl and aquatic mammals — such as beavers and muskrats — also benefit from aquatic plants. These plants also tie up a certain amount of nutrients in the water, which prevents excessive algal blooms.

"A point is reached, however, when aquatic plants become detrimental. This occurs when the coverage is so thick that fishing and recreation are inhibited, irrigation and other needs are impeded, and fish populations become unbalanced. There's a big gray area between coverage of weeds that is beneficial, and when it becomes a problem. In general, aquatic weeds that are exotics are more likely to completely choke a waterway than native plants."

Identification of aquatic weeds can be tricky. Elodea and hydrilla, for example, are almost identical in appearance. Yet, when strands of elodea are drawn through the hand they will feel soft and pliable while hydrilla generally feels harsh and brittle.

"Anyone who has a problem with aquatic weeds should contact his or her local agricultural extension agent," said Langeland. "The extension agent will identify the weed, and develop recommendations for treatment. Landowners should not treat aquatic weed problems on their own. Some of these weeds don't respond to herbicides, but may be effectively treated with draw-downs or biological controls. Timing of treatments is also important. Weeds should be controlled early in the season, and not in mid-summer when large, expensive amounts of chemicals may be needed. Finally, all recommendations on doses and safety should be strictly followed when applying herbicides." ⊠



alligatorweed

illustrations by David Williams

Governor Hunt Honors Occasion

Wildlife Endowment Fund Passes $2 Million Mark

Written and Edited by Mark Taylor

Although North Carolina Governor James B. Hunt Jr. and other high-ranking State officials were present, it was three-year old Catherine Ward who stole the show when Governor Hunt recently honored the Ward family of Apex for purchasing a lifetime subscription to *Wildlife In North Carolina* magazine which pushed the North Carolina Wildlife Endowment Fund over the $2 million mark. In late October, Tom and Denise Ward of Apex had purchased the lifetime subscription as a gift for their daughter Cathy. To celebrate the occasion, Governor Hunt presented the Ward family with a handsome plaque.

"Cathy, do you like animals," the Governor asked during the presentation.

"Yes, and I like to fish with my dad in a pond in our backyard," the little girl replied.

"What kind of fish do you catch," the Governor queried.

"Catfish, bass and bream," the little girl answered. "Are there any big ones," the Governor continued.

"Oh yeah, some of them are this long," said Cathy, stretching out her arms to indicate fish of monstrous proportions.

A laughing Governor Hunt noted that Catherine had the makings of a natural born fisherman, and commented on the Wildlife Endowment Fund as he presented the Wards with the plaque.

"The Wildlife Endowment Fund is a wonderful program," said Governor Hunt. "It seems like only yesterday when we celebrated the fund passing the $1 million mark by presenting a plaque to Mr. S. Dillon Wooten of Goldsboro, who bought the lifetime sportsman's license that pushed the North Carolina Wildlife Endowment Fund past that important point. Now, less than a year later, we've passed the $2 million point. It's impressive to see that some 7,500 lifetime licenses and 230 lifetime subscriptions to *Wildlife In North Carolina* magazine along with numerous contributions have made this fund grow. I couldn't be prouder. The Wildlife Endowment Fund is an idea that makes sense, and offers a bright future for wildlife in our State. I commend the Wildlife Commissioners, Commission employees, and citizens who have helped make this program a success.

"Today, we wish to celebrate the passage of this great milestone which will do so much for the wildlife of our State, and will enable Catherine and other young North Carolinians to enjoy our rich wildlife heritage in the future. This beautiful plaque honors Catherine and her family for their role in reaching the $2 million mark. As Governor of North Carolina, I'm proud to present this plaque to this young lady, and wish to thank her family for their help in preserving our wonderful wildlife heritage. I would urge all North Carolinians to support the Wildlife Endowment Fund, and look forward to helping honor the fund passing the $3 million mark in the future."

The Wards live on the outskirts of Apex near Lake Jordan, and the entire family enjoys wildlife. Tom Ward is a chemist for the U.S. Environmental Protection Agency, and has a lifetime sportsman's license. He especially enjoys bowhunting for deer and hunting quail. Denise Ward taught biology at Durham Technical Institute before Catherine was born.

"We were completely surprised to learn that our gift subscription for Catherine had pushed the Wildlife Endowment Fund over the $2 million mark," said Tom Ward. "We're very honored to have helped the fund reach this point. We feel that the Wildlife Endowment Fund is an excellent program that offers a great future for wildlife in our State, and urge all North Carolinians to support this fund. We also bought the lifetime subscription to *Wildlife In North Carolina* for Catherine because it is a great bargain, and the whole family will enjoy it. We're sure that Catherine will take great pleasure in this gift subscription for years to come.

"We deeply appreciate the support that the Wards and countless other North Carolinians have provided for the North Carolina Wildlife Endowment Fund," said J. Robert Gordon, chairman of the N.C. Wildlife Resources Commission. "We also wish to thank Governor Hunt for the strong support that he has provided for this program."

Wildlife officials expect the rapid growth of the Wildlife Endowment Fund to continue. "Currently, the Wildlife Endowment Fund stands at $2.2 million," said Vernon Bevill, executive director of the N.C. Wildlife Resources Commission. "We expect the fund to pass the $3 million mark by the end of September."

Ken Taylor

Passing A Landmark: *North Carolina Governor James B. Hunt Jr. recently honored the Ward family of Apex with a plaque commemorating their purchase of a lifetime gift subscription to* Wildlife In North Carolina *magazine which boosted the North Carolina Wildlife Endowment Fund over the $2 million mark. The Wards bought the gift subscription for their three year-old daughter Catherine. Here, from left to right, are David Allsbrook of Scotland Neck, wildlife commissioner for District 3, J. Robert Gordon of Laurinburg, chairman of the Wildlife Commission, Governor James B. Hunt Jr., Denise Ward, Tom and Catherine Ward, Vernon Bevill, executive director of the Wildlife Commission, and Eddie Bridges of Greensboro, wildlife commissioner for District 5.*

Support The Tax Checkoff

Help Nongame Wildlife

It's still not too late to contribute to the Nongame Wildlife Fund. State income-tax forms are due by April 15, and this year for the first time these forms will enable North Carolinians to support the management and protection of nongame and endangered species.

Nongame species are animals which are neither hunted, fished for, nor trapped, and include most small animals and birds and all reptiles. Endangered species are animals which have been legally declared to be in danger of extinction.

The nongame tax checkoff allows residents of North Carolina receiving a refund from their state income tax to designate a portion or all of the refund for the management and protection of these animals.

"We urge all North Carolinians to support the nongame tax checkoff," said Jack Donnelly, coordinator of the nongame program for the N.C. Wildlife Resources Commission. "In the immediate future, the tax checkoff will fund restoration and management programs for bald eagles, peregrine falcons, and loggerhead sea turtles. Funds will also be used to further develop a statewide environmental-education program for our schools."

To contribute, start by taking a close look at the instructions for your 1983 North Carolina State Income Tax Form. On page 2 in the lower right-hand corner are instructions on how to contribute to the North Carolina Nongame Wildlife Fund. If you wish to support this fund, enter a donation from your refund on line 21 of the tax form. You may designate a portion of your refund (not less than $1) or all of your refund to be used to protect nongame and endangered species. This donation will not increase the tax you pay, and may be deducted from your income on the following year's tax form. If your tax returns are prepared professionally, tell your accountant that you wish to contribute to the nongame wildlife fund.

If you aren't receiving a refund but wish to contribute to the nongame wildlife fund, tax-deductible contributions may be sent to the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611. Please note on the check that the proceeds are to be used for nongame and endangered species.

Try Them Baked

Catfish Dear To Our Hearts

Judging from the number of "fish camps" located in the inland regions of North Carolina, catfish are one of the most popular freshwater fishes in the State. Many are the Tar Heel fish fanciers who will gladly pass up a plate of Calabash shrimp in favor of a platter of crisply fried catfish with side orders of French fries and cole slaw.

Ingredients

6 skinned, pan-dressed catfish
3 slices bacon, diced
1/2 cup minced onion
1/4 cup minced green pepper
1/2 teaspoon salt
1/8 teaspoon pepper
1-1/2 cups fresh bread crumbs
1 can (8 oz.) cream-style corn
1 can (8 oz.) whole-kernel corn drained
1 egg, beaten
3 slices bacon cut in half

If frozen, thaw the catfish and remove fins. If the cavities seem small for stuffing, enlarge by opening the tail portions — being careful not to cut completely through. Place fish in a well greased, 10-by-15 inch baking pan.

Cook the bacon until lightly browned, remove from skillet, and set aside two tablespoons of bacon drippings. Add onion and green pepper to skillet and cook until tender. Stir in salt, pepper, bread crumbs, cream-style corn, whole-kernel corn, egg and cooked bacon. Stuff fish loosely with this stuffing, place a half-slice of bacon on top of each fish, and bake in a 350-degree oven for 25 to 30 minutes or until the fish flakes easily when tested with a fork. Serves six.

— *Curtis Wooten*

Outdoor Workshops Slated

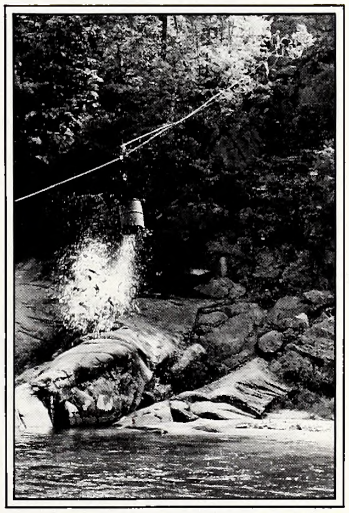
Teachers may wish to participate in one of the outdoor-education workshops being offered this summer by the N.C. Wildlife Resources Commission and the N.C. Division of Forest Resources. Each workshop offers three continuing education units of credit, and features investigations in soils, water, forests and wildlife. Simulations of land-use planning and community action projects are also included.

Educators in grades K-12 and in all curriculum areas will benefit from the workshops. Dates and locations of the workshops are as follows:

— Clemmons State Forest near Clayton from June 18-22
— Tuttle State Forest near Lenoir from July 9-13
— Holmes State Forest near Hendersonville from July 16-20

The registration fee for the workshops is $12. To register, or for more information, contact the N.C. Wildlife Resources Commission, Rick Estes — Division of Conservation Education, 512 N. Salisbury St., Raleigh, N.C. 27611 or call 919-733-7123.

Trout A'Plenty



Curtis Wooten

Fish From Above: *Over 680,000 trout will be stocked in mountain waters in North Carolina this year. These fish are being stocked in a remote section of the Wilson Creek gorge in Caldwell County with a cable stocking device that was built by the Wildlife Commission and the U.S. Forest Service.*

For Contributions To Duck Stamp Program

Legislative Officials Honored With Prints

Four North Carolina legislative officials were recently honored for the support that they provided to the 1983 North Carolina Voluntary Waterfowl Stamp program. In appreciation for this support, the N.C. Wildlife Resources Commission recently presented framed, conservation edition art prints of the 1983 North Carolina State Waterfowl Stamp to North Carolina Lieutenant Governor James C. Green of Clarkton, Speaker of the House of Representatives Liston B. Ramsey of Marshall, Senator Joseph E. Thomas of Vanceboro, chairman of the Senate Committee on Natural and Economic Resources and Wildlife, and House Representative James E. Lambeth Jr. of Thomasville, chairman of the House Wildlife Resources Committee. Governor Hunt had been presented a similar print on an earlier occasion (see *Wildlife In North Carolina*, January 1984). Only 250 of these special conservation edition prints were produced and will be assigned by the Commission each year. These four offices will receive current waterfowl stamps annually.

"We're very grateful for the support that these men provided for the passage and implementation of our State waterfowl stamp program," said J. Robert Gordon of Laurinburg, chairman of the N.C. Wildlife Resources Commission. "In its first year, the North Carolina program has become the second most successful state waterfowl stamp program in history. This program will provide a big boost to waterfowl conservation and management in North Carolina in the future."

The design for North Carolina's 1983 waterfowl stamp, which was painted by well-known wildlife artist Richard Plasschaert of Minnesota, featured a hen and drake mallard coming into a swamp. Over 13,650 regular limited-edition art prints of the stamp were sold, and the Wildlife Resources Commission raised approximately $500,000 through this program.

Lawrence S. Earley

North Carolina Lieutenant Governor James C. Green *was recently presented with a conservation edition art print of the 1983 North Carolina Waterfowl Stamp in appreciation for his support of the program. Here, Vernon Bevill, (left) executive director of the N.C. Wildlife Resources Commission, presents the print to Lieutenant Governor Green.*

Lawrence S. Earley

North Carolina House Representative James E. Lambeth, Jr., *chairman of the House Wildlife Resources Committee, was recently presented with a conservation edition art print of the 1983 North Carolina Waterfowl Stamp in appreciation for his support of the program. Here, Vernon Bevill (right), executive director of the N.C. Wildlife Resources Commission, presents the print to Representative Lambeth.*

Ken Taylor

Speaker of the North Carolina House of Representatives Liston B. Ramsey *was recently presented with a conservation edition art print of the 1983 North Carolina Waterfowl Stamp in appreciation for his support of the program. From left to right are J. Robert Gordon, chairman of the N.C. Wildlife Resources Commission, Speaker of the House Ramsey, and Vernon Bevill, executive director of the N.C. Wildlife Resources Commission.*

Ken Taylor

North Carolina Senator Joseph E. Thomas, *chairman of the State Senate Committee on Natural and Economic Resources and Wildlife, was recently presented with a conservation edition art print of the 1983 North Carolina Waterfowl Stamp in appreciation for his support of the program. From left to right are J. Robert Gordon, chairman of the N.C. Wildlife Resources Commission, Senator Thomas, and Vernon Bevill, executive director of the N.C. Wildlife Resources Commission.*

Millions Endangered

Power Project Threatens East Coast Shad

Rex Gary Schmidt

On Borrowed Time: *Fishing the spring shad runs is a favorite sport for many Tar Heel anglers. However, a proposed tidal-power project in Canada's Bay of Fundy could drastically reduce shad runs along the entire east coast. Shad from as far south as the St. John's River in Florida migrate to the Bay of Fundy in the summer.*

Coastal shad runs may become a thing of the past if a proposed tidal-power project is built by the Canadian government in the upper reaches of the Bay of Fundy in Nova Scotia. Fisheries biologists studying the proposed project recently discovered that one-fourth to one-third of all the shad on the East Coast used the proposed site as a summer feeding ground, and millions of these fish would be killed by power-plant turbines during the course of a summer.

Powered by the bay's 53-foot tides, the proposed facility would be the largest tidal-power plant in the world — producing 4,800 megawatts of electricity. In comparison, Carolina Power and Light Company's Shearon Harris nuclear plant near Raleigh will produce only 900 megawatts of electricity when it is completed. The tidal project would include a five-mile dam studded with 128 to 140 turbines that would be 25 feet in diameter. On incoming tides, the turbines would lie idle and fish would be free to pass through the dam while water was being impounded. After several tidal cycles the water would be released and the impoundment drained while generating power, forcing fish to swim a gauntlet of swirling turbine blades. Dr. Michael Dadswell, a fisheries biologist with Canada's Department of Fisheries and Oceans, estimates that on each pass through the turbines almost 10 percent of the shad would be struck and killed by the blades. The fish remain in this portion of the bay throughout the summer, and their migration patterns show that they would enter the impoundment and pass through the turbines 10 to 20 times in the course of the season. Dadswell estimates that 40 to 90 percent of the approximately six million shad that use the bay as a summer feeding ground would be killed by the turbines in a single summer.

"The impacts of this project would be felt along the entire East Coast — including North Carolina," said Harrel Johnson, a fisheries biologist with the N.C. Division of Marine Fisheries. Johnson also serves as chairman of the shad and herring technical committee of the Atlantic States Marine Fisheries Commission. "First, there is the direct impact on fish. Shad will have to pass through the turbines, and many fish will be killed. Some form of safe passage for shad and other fish is needed.

"There may also be an effect on the ecology of the feeding grounds. Because of the extreme tides, huge expanses of mud flats are exposed to the air at low tide. This helps make these areas rich in nutrients, and biologically they are very productive. The power project would impound water on these flats over the course of several tides, reducing their exposure to air and sunlight. This might make them less productive, and could reduce their value as summer feeding grounds for fish."

Shad are a popular sport fish in North Carolina, and are routinely caught during spawning runs in the Tar, Cape Fear, Neuse, Chowan, Pamlico, Trent, Black and White Oak rivers. In addition, they provide a commercial fishery. In 1982, commercial fishermen in North Carolina caught 411,852 pounds of shad with a dockside value of over $180,000.

Fisheries biologists feel that the proposed tidal-power project may also hurt herring and alewife runs in North Carolina. In 1982, the commercial catch for herring and alewives was 9,437,703 pounds with a dockside value of $704,599. Most of these fish are caught in the Chowan River and in other coastal rivers draining into Albemarle Sound.

"We feel that alewives and herring migrate to the same summer feeding grounds as shad," said Roger Rulifson, a fisheries biologist at the Institute of Coastal Research at the University of North Carolina in Greenville. Before coming to North Carolina, Rulifson was at Unity College in Maine and worked with Dadswell on the power-project study. "When we were doing field work at the proposed power-plant site on the Bay of Fundy, we saw vast schools of herrings and alewives that were so thick you could almost walk across them. These fish are very similar to shad, and limited tagging studies indicate that herrings and alewives throughout the East Coast probably summer in the Bay of Fundy. We hope to expand our tagging program to gain more information."

Ultimately, biologists fear that the proposed project may affect many other species of fish.

"Shad, herring and alewives furnish a valuable source of forage for striped bass, tuna, bluefish and many other important species," said Johnson. "The loss of this forage base could certainly hurt many important fish populations and coastal fishermen in the long run."

Major In Marlin

Would you like to become a better saltwater fisherman? Consider attending the 33rd annual Sport Fishing School from June 17-22 at Hatteras. The school is sponsored by the Division of Continuing Education of N.C. State University.

The course includes two one-day fishing trips to the Gulf Stream, and instruction and practice in surf, pier, sound and big-game fishing.

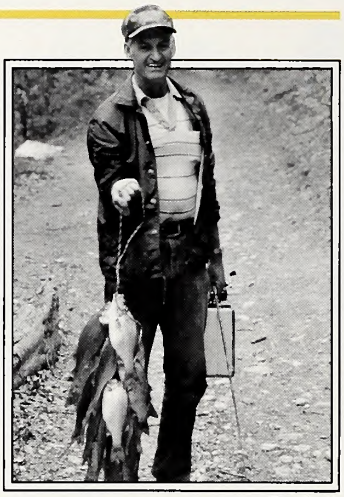
For more information, contact N.C. State University, Division of Continuing Education, P.O. Box 5125, Raleigh, N.C. 27650.

Spawning Action

Fast Fishing For White Bass

"White bass run when the dogwood blooms" is an oft-repeated phrase in North Carolina's western Piedmont. This is almost a foolproof prediction because white bass spawning runs usually begin in late March, peak in April, and don't completely end until May. At some point, the fish's run is bound to coincide with the blooming of the dogwoods. Like viewing the snowy white trees, however, fishing a white bass run is an experience that no one should miss.

"The Linville, Catawba, Uwharrie, Tuckasegee and Yadkin Rivers all host strong white bass runs," said Cape Carnes, Wildlife Commission supervising fisheries biologist for the Piedmont. "The fishing is often fast and furious during these runs. Although white bass are lake fish, they migrate up streams and rivers to spawn. When they reach an impassable obstacle such as a dam, or suitable spawning habitat, the run ends and the fish congregate in large numbers. Fishing is usually excellent in these spots."



Terry Shankle

A Day Well Spent: *Fishing the spring white bass runs can offer some fast and furious angling.*

Light spinning tackle with 4- to 8-pound test line is favored by many white bass anglers, and any flashy spinning lure works well. Be sure to bring plenty of extra lures because the tree-lined, rocky-bottomed rivers where the white bass run have a voracious appetite for terminal tackle.

— Terry Shankle

Calendar Of Events

April 5-8
North Carolina Azalea Festival at Wilmington. Features garden tours, arts and crafts, parade, and other events. For more information, write to Azalea Festival, P.O. Box 51, Wilmington, N.C. 28402.

April 7-8
12th annual Trout Derby in Watauga County. For more information, write to Mike Steele, Parks and Recreation Department, P.O. Box 47, Blowing Rock, N.C. 28605.

April 10-15
Grifton Shad Festival in Grifton. Features a shad fishing contest, fish fry, parade, canoe race, and other events. For more information, write to Janet Haseley, Box 928, Grifton, N.C. 28530.

April 13-15
Dogwood Open Trap Championship at the Pinehurst Gun Club in Pinehurst. For more information, write to the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

April 13-15
North Carolina Wild Foods Weekend at the Betsy-Jeff Penn 4-H Center in Reidsville. Learn to collect edible wild plants and prepare a wild feast. For more information, contact N.C. Wild Foods Weekend, Ken Perkins, P.O. Box 396, Elon College, N.C. 27244.

April 14
7th Annual Haw River Extravaganza at Bynum. Novice and intermediate whitewater races for canoers and kayakers. For more information, contact the River Runners Emporium, 1209 W. Main St., Durham, N.C. 27701.

April 19
UNC-Charlotte Wildlife Lecture at Cannon Lecture Hall at 8 p.m. Featured speaker is Russell Dickinson, director of the National Park Service. For more information, call 704-598-0729.

April 26-29
Southern Sport and Outdoor Show at the State Fairgrounds in Raleigh. Features hunting, fishing, boating, camping and other outdoor exhibits. For more information, write to Southern Shows, P.O. Box 36859, Charlotte, N.C. 28236.

April 28-29
Bluebird Symposium sponsored by the North American Bluebird Society at the Sheraton Inn at Southern Pines. Includes presentations on winter care and feeding of bluebirds, predator control, and field trips. For more information, contact Gay Duncan, P.O. Box 1315, Southern Pines, N.C. 28387.

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status On December 31, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	7,150	$2,089,055
Lifetime Hunting License	93	$15,662
Lifetime Fishing License	312	$51,257
Lifetime Subscriptions to Wildlife In N.C.	231	$25,678
Contributions		$33,359
		Fund Total: $2,215,031

Steve Maslowski

Check-In For Wildlife

NOT EVERY CREATURE is wise enough to survive without your help. Your tax-deductible donation will ensure a future for nongame and endangered wildlife.

Look for line 21 on your 1983 State Income Tax form D-400 and enter your contribution.

Migrating Monarch

A monarch butterfly rests momentarily during its migration through western North Carolina.

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WILDLIFE IN NORTH CAROLINA

MAY, 1984 75 CENTS

Steam On The Rivers

by Jim Dean

Trailing plumes of smoke over their gleaming decks, the steamboats of the Mississippi River quickly captured the imagination of 19th-century America and became a part of our folklore, a part as durable and irresistible as the cowboy.

Less well known is the fact that steamboats were also common fixtures on most of the navigable rivers of North Carolina — and some not so navigable. During the period from 1918 to 1939, for example, more than 100 steamboats are known to have run the Cape Fear River from Wilmington to Fayetteville, although their numbers were few towards the latter years. No doubt, there are some who still remember the last of the Cape Fear steamboats, the *Thelma,* that ran the river from 1914 until 1939. For the use of one of her 10 small staterooms on the middle deck, the charge was 75 cents for an overnight run including two meals.

N.C. Archives and History

This early photograph shows a steamboat, probably the Greenville, *heading up the Tar River. Such boats were once common in North Carolina.*

Yet, while the Cape Fear was undoubtedly the premier steamboat river in the state, virtually all of the coastal rivers and many of the Piedmont waterways carried extensive steamboat service. Nor were all of these boats small. Most averaged between 60 and 120 feet long, and the best of them may have rivaled the fabled Mississippi packets.

Steamboating in North Carolina grew out of a need to find an efficient way to transport naval stores — tar, pitch and turpentine — from the inland forests to seaports. Large flat-bottomed barges were used for years, powered upstream largely by the tidal surges found in the lower reaches of such rivers as the Black, South and Cape Fear.

In 1818, 11 years after Robert Fulton made his historic first steamboat run on the Hudson River in New York State, three steamboats were built and placed into service in North Carolina — two on the Cape Fear and one on the Neuse. Although the steamboat *Norfolk* actually made the first run in April on the Neuse, it was the Cape Fear's *Henrietta* that really introduced the state to the practicality of steamboating. After a maiden voyage in July of that year, she remained in service for 40 years and earned an estimated $1.5 million on the 115-mile run from Fayetteville to Wilmington.

The accidents that plagued the Mississippi steamboats were equally common on North Carolina rivers, and many of these boats had short-lived careers. Others, however, seemed to live a charmed life. The *A. P. Hurt,* a large iron-hulled steamer built for trade on the Cape Fear in 1860, lasted 63 years on the river, despite burning to the waterline twice.

Undoubtedly the most remarkable steamboat venture in North Carolina took place on the notoriously treacherous French Broad River 2,200 feet above sea level. In 1876, after much controversy, Congressman Robert B. Vance obtained a $25,000 federal appropriation to clear shoals, blast rocks and build jetties that would permit steamboat traffic from Asheville upstream to Brevard — a stretch of river that today still seems better suited to a canoe.

While the river was being cleared, Col. S.V. Pickens chartered the French Broad Steamboat Company and with an additional privately funded $25,000 began construction of a rather handsome, though boxy, two-deck side-wheel steamer named the *Mountain Lily.* Powered by two 12-horsepower engines — one for each wheel so that the river's many curves and swift current could be safely maneuvered — the craft was completed and put into service in 1881. The *Mountain Lily* could carry the weight of 100 passengers or the same weight in cargo, yet her flat hull drew only 18 inches of water.

Midst great pride and celebration, the *Mountain Lily* made her first run early in 1881, but her glory did not last long. That summer, a prolonged drought reduced the powerful French Broad to little more than a sluggish trickle as the water level fell to its lowest point in 25 years.

Still, the early runs had proven promising, and while more jetties were being constructed and shoals removed, the pride of the river made short trips in the vicinity of Asheville. But in early fall, heavy rains brought the French Broad to full flood and beyond, washing huge quantities of sand and mud into the channel and trapping the *Mountain Lily* at King's Bridge.

For years, the steamboat lay abandoned in the edge of the river under towering trees and mountains, her prow buried in the mud. The dream of the highest steamboat line in the lower 48 finally ended when the *Mountain Lily* was dismantled, although a boathouse erected for her at Johnson's Bridge was used as a Baptist meeting house for many years.

Within 50 years, the days of steamboating even on the more gentle Coastal Plain rivers were numbered as another form of steam transportation — the railroads — replaced the proud river boats.

Today, a fisherman drifting any of these rivers might have a hard time imagining what it must have been like to hear the whistle and see a steamboat wreathed in smoke come round the bend.

May, 1984
Volume 48, Number 5

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Cover *This ruby-throated hummingbird hovers in front of a flower as it sips nectar with its long bill. Photograph by Bill Duyck.*

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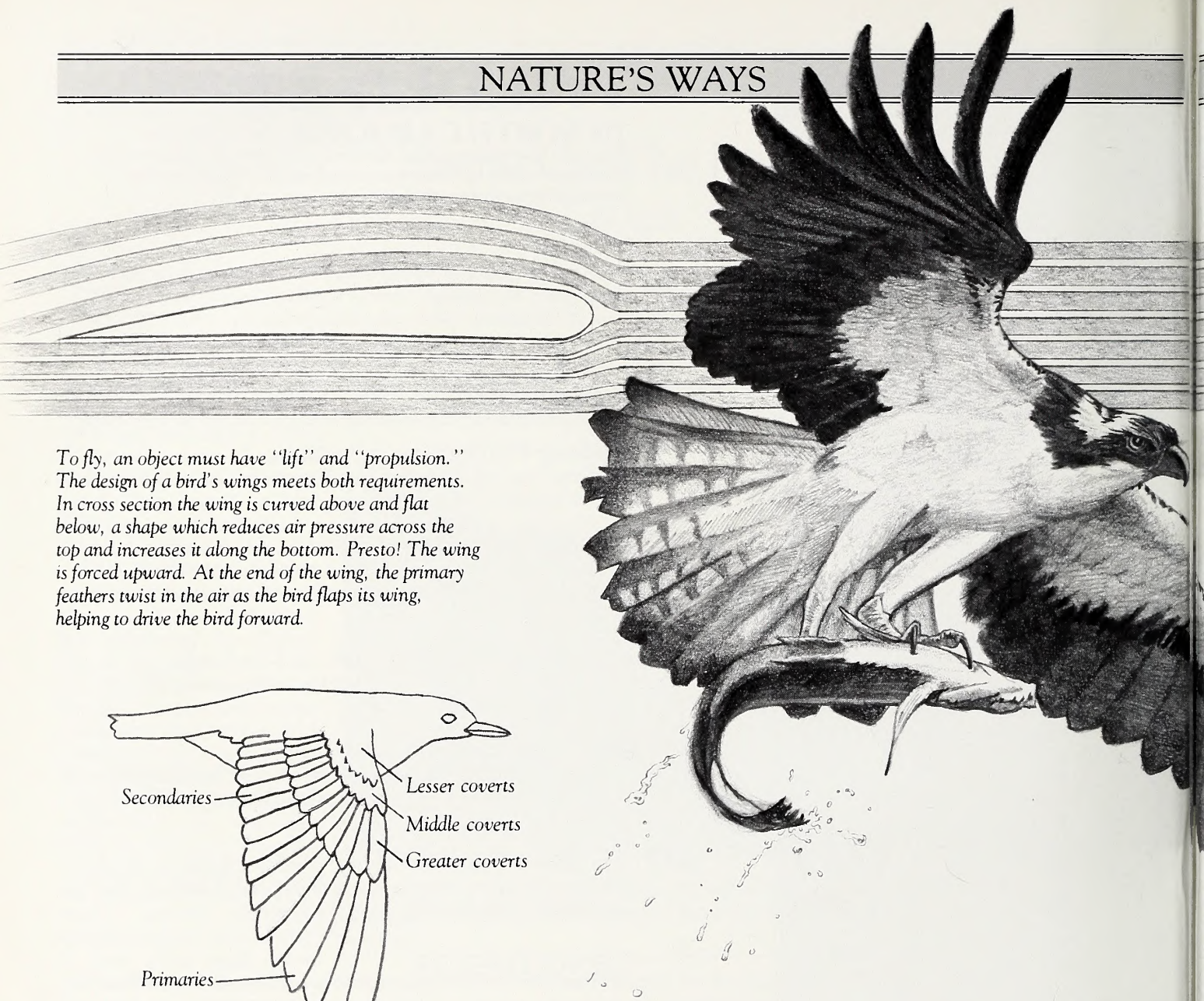
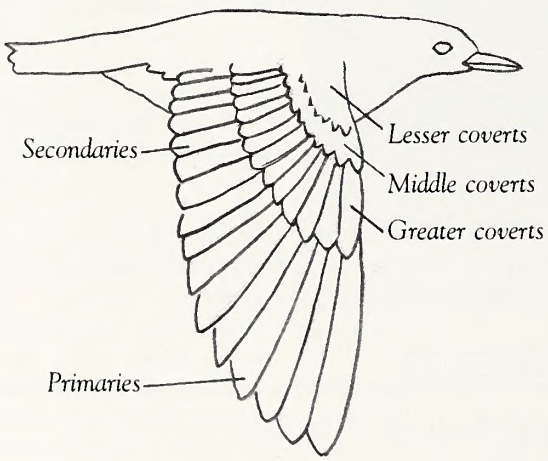


To fly, an object must have "lift" and "propulsion." The design of a bird's wings meets both requirements. In cross section the wing is curved above and flat below, a shape which reduces air pressure across the top and increases it along the bottom. Presto! The wing is forced upward. At the end of the wing, the primary feathers twist in the air as the bird flaps its wing, helping to drive the bird forward.



On The Wing

written by Lawrence S. Earley / illustrated by David Williams

The wing of a bird is a marvelous marriage of bone and skin and feather. Note the streamlined shape of a bird's wing, the way the thickest and strongest edge meets the air and tapers to the rear. Note also that a bird's wing is rounded on top, flat on the bottom, a design that causes air pressure to push the wing up and keep the bird aloft. Look at the long, fingerlike primary feathers at the end of the wing, the shorter secondaries near the body. The primaries propel the bird forward.

Though these features have enabled birds to fly, birds practice their aerial pursuits in very different ways. Some soar far above the earth, others dart and twist through heavy brush, and one unusual bird can hover like a bee for seconds in front of a flower (See "Those Incredible Hummingbirds," p. 8). In each case, nature has equipped the bird with a wing shape that is useful for flying in a particular way and in a particular habitat.

Take birds that haunt woodlands and brush, for example. Grouse, quail, doves and songbirds such as cardinals, sparrows, chicadees, warblers and thrashers do not need to fly often or for long distances. They need an explosive lift off, but then they can glide, twisting and turning through their brushy habitat. Short, rounded wings give these birds lift and plenty of maneuverability, but not much endurance. The explosive flapping that gets them off the ground quickly also tires them out, and they have to rest.

For larger birds that soar, the short and rounded wings of quail and grouse would be useless. Hawks, eagles and vultures are birds that ride the warm-air thermals that rise above the landscape like pillars. These columns of rising warm air are formed by the unequal heating of the ground — bare fields heat more quickly than wooded land. The soaring birds ride the warm air as if it were an elevator, spiralling upward until the updraft dissipates.

All birds' wings have a similar arrangement of bones and feathers, but different shapes. These differences enable birds to exploit a variety of habitats. There are about 8,700 bird species worldwide, but most have wings that fall into four categories.

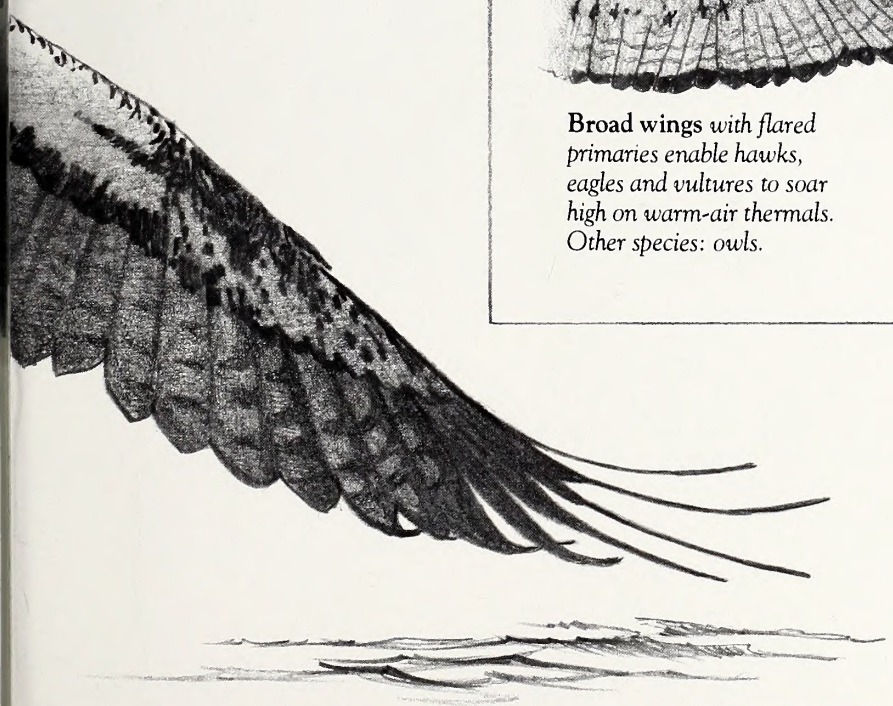
Long, narrow, tapered wings *enable gulls to ride the winds, soaring up and down for miles far at sea. Other species: albatrosses, frigate birds.*

Short, rounded wings *give grouse, quail and doves their explosive lift and excellent maneuverability. Other species: songbirds.*

Broad wings *with flared primaries enable hawks, eagles and vultures to soar high on warm-air thermals. Other species: owls.*

Long, narrow, flat wings *give falcons and swallows the ability to fly far and fast. Other species: swifts.*

D. Williams



Then they float downward, looking for another thermal (See "Appalachian Wind Surfers," September 1982, p. 2-3). These birds need a short and broad wing to provide maneuverability and a wide surface on which to float. Widely separated primary feathers give them extra lift. Equipped with such wings, soaring birds can travel for hundreds of miles.

This kind of soaring is called "static soaring." Sea birds also soar, but in a different way and for their "dynamic soaring" they need wings with another shape. Gulls and other ocean-going birds such as albatrosses fly long distances over water sometimes by riding vertical columns of warm air much as hawks do, but more often by riding the air currents that blow horizontally over the water surface. To take advantage of the often swift winds, the sea birds have evolved long, thin wings that, in the case of the albatross, narrow to a point. With this wing design, gulls can follow boats for days, gliding up to catch the faster breezes, and then swooping downwind at great speeds.

Another wing design is found on fast-flying birds that travel far essentially by flapping their wings. Swallows, falcons, shorebirds and hummingbirds have proportionately long wings that sweep back and taper to a point. Because they are so narrow, they are useless for soaring and give the bird little maneuverability, but their shape is the most efficient for speed. These birds also have large chest muscles to power their flapping flight; the hummingbird's chest muscles make up about 30 percent of its body weight.

The different shapes of bird wings are the results of adaptation, or the process by which animals change slowly over time to cope better with the environment in which they live. What may be amazing is that with 8,700 species of birds worldwide, there are so few variations in wing design. After 150 million years of developing the bird, nature has evidently found a few patterns that are simple and yet complex and that meet the chief test of any functional design — they work. ⊠

Stalking The BIG ONE

Most experts say it takes stealth, skill, luck and a real mouthful to entice a trophy brown trout.

written and photographed by Jay Davies

The large brown trout lay suspended beneath the undercut roots of the sycamore. Its square tail sculled slowly, providing just enough thrust to maintain its massive body in the sluggish eddy.

The sycamore was one of the fish's favorite haunts. From under its dark recess he could safely watch the adjacent pool unseen. Crayfish, stone rollers and other minnows were his usual prey, but sometimes he would get lucky and catch small trout. Once he had eaten a young red squirrel as it tried to cross the river.

Several minnows fed near the lip of the pool, and one of them drifted downstream near the swirling eddy under the tree. It did not take much energy, just a few quick sweeps of his tail and the brown had it.

As the sun rose, penetrating the grey mist of dawn, a small rainbow trout entered the pool. It appeared to be injured as it wobbled through the water feebly, swept along by the current. The big trout easily captured it, but this meal felt different. Its flesh was not soft, and when the brown turned to swim back under the tree, the small fish pulled the other way. It had looked so weak, yet now it was actually pulling him back towards the middle of the pool. The brown opened his jaws to release the rainbow, but it would not come free. He turned downstream and raced through the riffles into a lower pool. For a moment, he sensed he was free, but the resistance was still there. He darted towards an undercut rock, but was unable to gain its shelter, and began to swim in wide circles. Finally he could resist no longer and he felt himself being towed through the pool. A towering shape came into view as he was lifted out of his watery world into the bright sunlight.

The angler waded to the bank with his prize. Only one hook had remained embedded in the fish's mouth; the others dangled impotently from the lure in a twisted array. The angler sat on the bank and admired the huge brown as it lay motionlessly on the grass, its large red and black spots and golden flank reflecting the morning sun. It truly was a majestic fish.

As the angler savored this moment of triumph, he also realized that he had lost something. His gaze returned to the fish and he remembered the excitement he had felt the first time he had seen it, over two months ago.

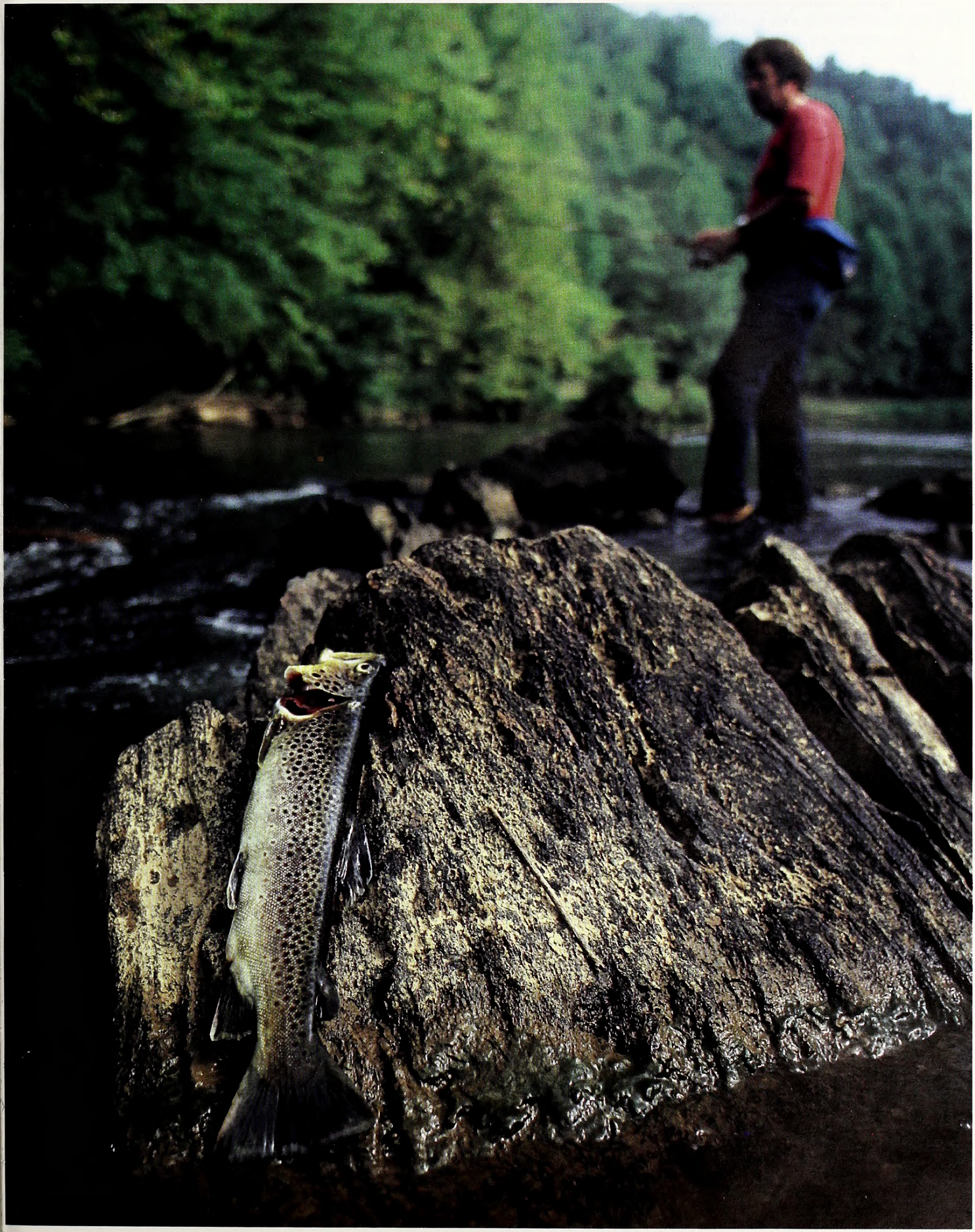
It had been late February, and the winter cold of the river had numbed his legs even though he wore insulated waders. The river was swollen with snowmelt from the ridges and he had to lean into the current as it tugged the gravel from under his feet.

He had been wading through the dark water, casting to likely looking spots for some time when he saw the sycamore overhanging the river's bank. The cavity created by its undercut roots looked promising and he cast his lure towards it. As he began his retrieve and the lure neared the tree, a dark shape glided slowly from the shadows. It so unnerved him that his hand slipped on the reel's icy handle and caused the lure to jerk unnaturally. The shape turned and rushed back under the tree, a swirling wake the only evidence of its presence. It was what the angler had been looking for — a large brown trout — and he knew he would come back again and again hoping to catch it. Now the quest, the anticipation, had ended, but the months of careful planning and stalking had been worth it.

Trophy brown trout do not come easily, and serious anglers may spend countless hours, days or months just locating a large fish. Even if they are just fishing for a "mess" to eat, these devotees are constantly scouting for the big ones.

"For me, it's a matter of intuition," says Dwight Howell of Hendersonville.

Though some large trout are caught by accident, capturing such a trophy usually takes some special techniques.



"Something about a particular hole will make me think there is a big one there." Dwight looks for places where the current washes in close to some type of cover, like a rock ledge, undercut bank, submerged log, or perhaps the undercut roots of a large tree. He believes that a big trout chooses such places because they provide concealment and the fish does not have to go far to get food — the current carries it to him. "Big browns appear to be kind of lazy," he explains. "They seem to look for a place where they won't have to work very hard to get a bite to eat."

Small floating-diving lures fished on ultra-light spinning tackle account for some big trout, and experienced anglers often touch up their lures to make them more closely resemble small trout or stream minnows.

Many anglers locate big trout when the streams are low and clear since these conditions make the fish easier to see. David Gordon of Bryson City prefers to lure the "lunkers" from their hiding places with a 4-inch long Rapala painted to resemble a brown trout fingerling. "Occasionally I'll catch a 14- or 15-inch fish when I'm scouting using this method," he says but usually the really big ones see him and run back under the cover before they take the lure. Once David marks the location of a large fish, he leaves the stream knowing he can return another day to fish and be assured that the trout will be in the same location.

Dr. Jerry West, an associate professor of biology at Western Carolina University in Cullowhee, has performed extensive research investigating the movement of brown trout within streams. One study lasting 12 months involved repeated collections of the fish in a stream. Dr. West often found the same fish hiding in the same pool and frequently even under the same rock or log. "I believe," he says, "that once a brown trout reaches a certain size, it stakes out a claim to a pool and jealously defends it against intrusion by other trout. That pool apparently provides all of the trout's environmental requirements for food and cover and it doesn't need to move."

Even though big browns are "home bodies" and prefer to remain in a favorite place, an angler should expect the fish to be anywhere in an area from 50-yards downstream to 50-yards upstream of the location he believes the fish to be. That's because even large trout move around sometimes to feed in nearby pools or riffles, and especially in high water or at night. They may also seek out cooler water around springs during late summer. Finally, during the fall spawning period, they may travel upstream good distances to find a good spawning place.

Lunker browns over 20 inches are usually caught in the larger mountain rivers of western North Carolina because these rivers support an abundance of forage fish and have large, deep pools which the big ones like.

However, big browns also show up in some surprisingly small creeks. Bill Bonner, trout research biologist with the N.C. Wildlife Resources Commission has collected many 15- to 20-inch fish from streams one could easily step across. "The key to a good brown trout stream," he says "is lots of cover in a gently flowing creek which meanders its way through a valley."

Some of the best streams fitting this description are often right under our noses. These streams are frequently very accessible; some even run through towns. "I've often fished streams that get heavy pressure from anglers fishing night crawlers, corn and doughballs and come out with an arm-length fish," says David Gordon. "That's a real treat."

The key to catching lunker browns from these streams is to fish them correctly. Planning often makes the difference between going home empty-handed or with a trophy. Many anglers prefer to observe a big fish for several days, learning when it feeds, where it is at different times of the day and how it reacts when frightened. They also develop a mental map of the river and pay special attention to the location of any boulders or sunken logs which might snag their fishing line. This information becomes indispensable when the angler is actually fishing because he knows exactly where to cast his lure even though he is concealed behind a bush and may not be able to see into the water.

The importance of remaining concealed cannot be overemphasized. Big browns are extremely wary and constantly on the lookout for unusual shadows, movements, ripples on the surface of the water and underwater sounds which could signal the presence of an angler or other predator. Most anglers, in addition to wearing dark clothes and hiding behind bushes and rocks, pay particular attention to avoid splashing the water or kicking underwater rocks. Heavy steps or a rolling rock will frighten trout for a surprising distance.

Like most fishermen, anglers who pursue big browns won't turn down a day of fishing regardless of the weather. Most, however, prefer to fish during or after a light rain when streams are slightly off-color. At such times, trout are usually feeding on the bountiful supply of aquatic insects and other kinds of food which are washed downstream. When trout are feeding heavily, they are often less wary, and the reduced visibility in the water also may impair the trout's ability to discern if a lure is the real thing or an imposter.

David Gordon describes the color of water he looks for as "stained like tea or weak coffee." The water can get too dingy, cautions David. Once it reaches the color

of coffee with cream, it's difficult to wade and the fish seem to have a hard time seeing the lure.

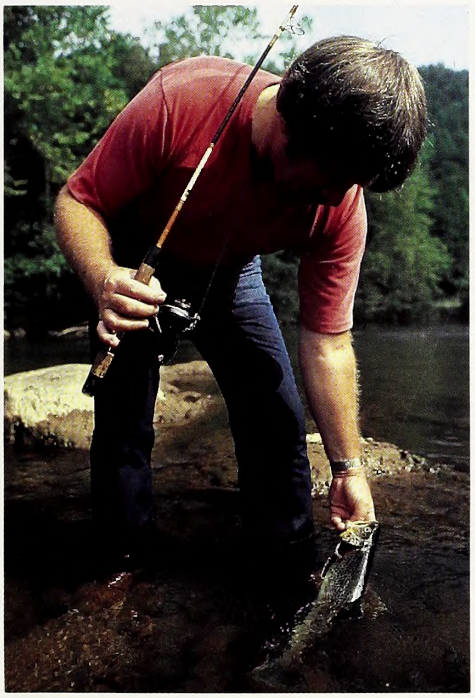
Anglers who seek trophy browns have different opinions about the best season of the year to fish. David, who fishes primarily with lures and bait, finds the fish most active and willing to take a lure in May and September. Dwight Howell fishes exclusively with artificial flies, and he prefers the late summer months when the creeks are low and he can see what he is doing. During hot weather, big trout also frequently go on a feeding spree after a cool shower. Other experts prefer late fall when big browns are likely to be away from their home pools while looking for a place to spawn. Indeed, big trout can be caught throughout the year if the angler is persistent and knowledgeable.

The best time of day to fish is also a matter of personal preference. Early morning and dusk are always popular, but some very successful anglers prefer midday. All agree, however, that it is at night that the biggest browns really begin to feed. These fish abhor daylight and prefer to remain in the shadows, but at night they boldly venture forth and aggressively feed. Anglers are cautioned, however, that it is against the law to fish at night in streams located on game lands in western North Carolina.

There are several proven methods to fish for lunker browns. Dwight Howell likes to use a fly rod and fishes large wet flies or nymphs like the Hare's Ear, Bitch Creek Special or a local pattern developed by the late Cap Weise called a Sheep fly which he ties on a size 6 hook. "I used to use a bamboo rod, but since the development of graphite rods, I prefer their feel, strength and sensitivity," he says. Dwight uses a 9-foot rod with a 4- or 5-weight line for most of the water he fishes, but he has a 10-footer with 6-weight line for really big water and a 7-footer for the cramped quarters on a small stream.

Fishing with lures is popular with some of the pros and a large 4- or 5-inch long Rapala, Rebel or similar lure, painted to resemble a rainbow or brown trout is a hot item. It is important that the lure swim "true" and not flip, skip or roll as it is retrieved. Sometimes the lip, located at the front of the lure, may be damaged or needs to be adjusted. If the lip is constructed of metal, adjustments can be made with pliers. Plastic lips must be heated first and then bent. A candle flame works well, but be careful — if the plastic gets too hot, it will become distorted quickly. If the lure runs to the left, twist the lip downward slightly on the left (same) side and that should correct the problem. If the lure tends to run to the right, reverse the procedure.

Some anglers like to replace the treble hooks on lures with a single hook, and on "native" streams, single hooks are required by regulation. A single hook may make it more difficult to hook a big fish, but it improves the fish's chance of surviving if the angler decides to release it. It also makes it possible to release smaller fish without injury.



Jerry Hodge admires a fat brown trout that took a lure. Lures, natural bait and even flies will take trout if you know how to fish them.

Some anglers like an ultralight spinning outfit, but David Gordon believes these rods lack the stiffness needed to drive a hook into the hard mouth of a big brown. He uses a medium-action rod in combination with an ultra-light spinning reel loaded with light line. The heaviest line he uses is 6-pound test and he prefers 4-pound test since its smaller diameter is harder for the fish to see and gives his lures better action.

Where legal, live bait has always been productive and nightcrawlers, soft crayfish, salamanders, minnows and crickets are all excellent. There are numerous ways to rig bait, but the most important point to remember is to completely hide the hook in the bait. A trout will mouth the bait before swallowing it, and if the fish feels anything unnatural, it will spit it out.

Bait should be fished much like a wet fly or nymph. The bait is cast upstream and allowed to drift with the current. If you note a hesitation in the drift, even though it may feel as though it is hung on the bottom, set the hook anyway. A lunker brown may have picked up the bait.

It is important to get a natural-looking drift when fishing bait or wet flies. If the fishing line crosses a current moving faster than the current carrying the bait, the line will be pulled by the faster current and it will drag the bait thorugh the water. Most trout, especially big ones, will not take a dragging bait or fly.

You can get a more natural drift if you rig the bait properly. One method is to tie the fishing line directly to the hook rather than use a leader which is stiff and may hinder the drift. A BB-sized split shot should be attached to the line about 6 to 20 inches above the hook to allow the bait to drift freely and stay suspended slightly off the bottom.

If you are lucky enough to hang a real monster, be prepared for a battle. Big browns are extremely powerful, entirely at home in their element and will try every trick you can imagine to get loose. To be successful, an angler needs to be able to think quickly and improvise when needed. It also helps to be lucky.

In most cases the fish will attempt to use the current and make long downstream runs. David Gordon recalls a 7-pound fish that took him down stream a good 300 yards. "Periodically the brown would stop and rest behind a big rock and give me a chance to catch up," Gordon recalls, "but as soon as he'd see me, he'd take off again for another 20 or 30 yards."

In the excitement of stalking or playing a big trout, safety is often overlooked by anglers, yet there are some potential dangers when fishing large rivers. Some rivers, like the lower Nantahala, have hydroelectric dams upstream, and can become raging torrents in seconds when the turbines are generating. Power companies can usually predict when they will be generating several days in advance and anglers are advised to call and request their generating schedule.

Despite the odds against those few dedicated anglers who pursue trophy brown trout, there are few things more rewarding or satisfying. From my experience, the payoff lies not in catching a fish worthy of mounting on the wall, but rather the quiet satisfaction of matching wits and skill against a trophy that has reached large size through incredible wariness and instinct.

"It's the challenge," says Dwight Howell. "I believe a big brown may be the hardest fish to catch, and once you land one, you get hooked yourself." ⊠

Steve Maslowski

These tiny birds burn energy like a blast furnace, fly like a helicopter, fight like banshees and breed on the wing.

Those Incredible HUMMINGBIRDS

by Jane Rohling

If you saw a bird the size of a bug, with wings that vibrated so fast that they disappeared, feathers that flashed in the sun like polished metal, and a bill like a darning needle, would you be surprised? And, if this bird could fly backwards, forwards, upside down and sideways — would you believe your eyes?

That's the way it is with hummingbirds: They seem to belong more to the magical realm of fairies and unicorns than to our ordinary world. That's undoubtedly why some of them have been given such names as "purple-crowned fairy" and "fork-tailed woodnymph."

These extraordinary little birds are found only in the Western Hemisphere where over 320 species have been discovered. Evidently, their ancestors found the ocean barriers too vast to cross, but in the New World they have expanded their range from Saskatchewan to Tierra del Fuego, adapting to every kind of climate. The ruby-throated hummingbird *(Archilochus colubris)* is the only species that calls North Carolina home — in fact, it is the only species found east of the Mississippi River and one of only four species found as far north as Canada.

Hummingbirds have practically redefined the meaning of the word flight with their abilities in the air. Scientists have long been impressed with their aerial feats and have recently used high speed photography and stroboscopic lighting to unravel many of the mysteries behind hummingbirds' flight. Stroboscopic lighting uses a tube capable of firing many bright flashes in an incredibly short amount of time. It is extremely useful in examining movement, because it stops action many times each second and allows the viewer to see each step.

At his house in Chapel Hill, Carl Buchheister, president emeritus of the National Audubon Society, told me about some of these experiments. He has been a hummingbird watcher for many years.

Jane Rohling

Three-inch blur, the ruby-throat at the trumpet vine (left) is North Carolina's only hummingbird species. One ruby-throat weighs three grams, or as much as a copper penny. (It takes 150 pennies to make a pound.) Flame azalea (above) is another hummingbird favorite.

"Flight speeds of hummingbirds are very interesting," Buchheister said. "Their wingbeat has been calculated using stroboscopic photography. When they're hovering getting food from a plant their wings beat 55 times per second. Can you imagine that speed? It only takes one second to say 'Lucky Strike.' And that's 55 complete beats up and down . . . And when they're backing away from a plant it's about 61 beats per second, and when they're on their way, just starting out they're at about 75 beats per second." In quick maneuvers like courtship flights their wings move up to 200 times per second.

Another scientist, Crawford Greenewalt, experimented with hummingbirds in a wind tunnel to measure the speed of the hummingbird's flight, and

found that a female ruby-throat could achieve a speed of 29 miles per hour while struggling against the adjustable air stream. In plunging flight they have been clocked at over 60 miles per hour!

These feats are possible only because hummingbirds have a different structure than other birds. Whereas all other birds except the swifts articulate their wings freely at the shoulder, elbow and wrist, the hummingbird's wing rotates mainly at the shoulder. The long paddlelike wing is virtually all hand. Actually, the hummingbird model is a unique design somewhere between the insects and the birds. But if the hummingbird model were extended to the size and weight of a swan,

Richard Bird

Feathers of a hummingbird are essentially colorless. Iridescent colors (above) are caused by feather layers breaking up daylight like millions of tiny soap bubbles and reflecting it as violet, blue, green or golden rays. For the iridescence to be seen the bird must face the light coming from behind the observer. If the bird turns its head just a few degrees, its sparkling ruby collar turns flat black!

its wings would have to be 32 feet long.

It takes some pretty strong wing muscles to power any type of flight and in most strong flying birds the pectoral muscles account for 15 to 25 percent of the body weight. The hummingbird's flight muscles comprise 25 to 30 percent of its weight.

There are other advanced aeronautical features in this tiny muscular package. Most birds get power only on the downstroke, but not the hummingbird. With each lift of its wings, the hummingbird tips the front edges backwards so that power is maintained on the upstroke and the downstroke even when the bird is upside down. The result of this double action is an explosive acceleration and a speed that is astonishing for so small a bird.

Greenewalt compares a hummingbird to a helicopter: "If a helicopter hovers, the rotor is in a plane parallel to the earth's surface — so are the wings of a hummingbird. As the helicopter moves forward or backward, the rotor tilts in the appropriate direction — so do the wings of a hummingbird. The helicopter can rise directly from a given spot without a runway — so can a hummingbird."

There are a few other birds that can fly backwards or hover, but none can do so with the ease of a hummingbird. And no other birds, not even "whirly birds," can fly sideways. How the hummingbirds do that remains a mystery.

Hummingbirds must expend an enormous amount of energy to power their muscular body. Indeed, they have the highest energy output per unit of body weight of any warm-blooded animal, and they burn up fuel at a fantastic rate. While hovering, a hummingbird expends ten times more energy than a man running about nine miles an hour.

Even at rest, the metabolic rate of a hummingbird is more than 50 times as fast as a human's. Its heart is the largest of all warm-blooded animals (relative to its size), and it beats 500 to 1,200 times per minute, depending on the bird's activity.

A small bird with such a high metabolism faces some significant problems. For one thing it has to obtain enough food to fuel its energy output.

While humans can get along on a charge of fuel three times a day, hummingbirds have to refuel almost continuously. Like athletes, they have chosen sugar as their high energy fuel source because it enters the blood speedily and delivers fresh fuel to the muscles in the shortest possible time. Every day a hummingbird visits from one to two thousand flowers, taking in more than half its weight in nectar. A man's daily output of energy is about 3,500 calories. The daily output of a hummingbird, if calculated for a 170-pound man, is equivalent to about 155,000 calories. A man would have to consume 285 pounds of hamburger, 380 pounds of boiled potatoes, or 140 pounds of bread a day to meet these demands!

Another problem faced by the hummingbird because of its high metabolism and frantic activity is conserving its fuel supply and maintaining its body heat. The hummingbird's body temperature is normally a little higher than ours, about 104 F, and its small body loses heat very rapidly. Very small warm-blooded animals in a cold climate have to eat a great deal at short intervals to provide the fuel that maintains their body heat, or come up with another solution to the problem.

One solution hummingbirds have found to the problem is to go into an unconscious, comalike state called torpor. In torpor the bird's body temperature drops, its breathing and heartbeat are reduced, and the bird is incapable of movement. Its body uses about one-twentieth the amount of energy it would during normal sleep in this condition. When the temperature rises, the bird slowly wakes up.

"A friend of mine actually went out in the garden one day and found flat out on top of a flower a hummingbird that looked as if it were dead," recalled Buchheister. "She picked it up and took it into the warmth of her house. In a few minutes it awakened from its condition of torpor and began to fly around the room."

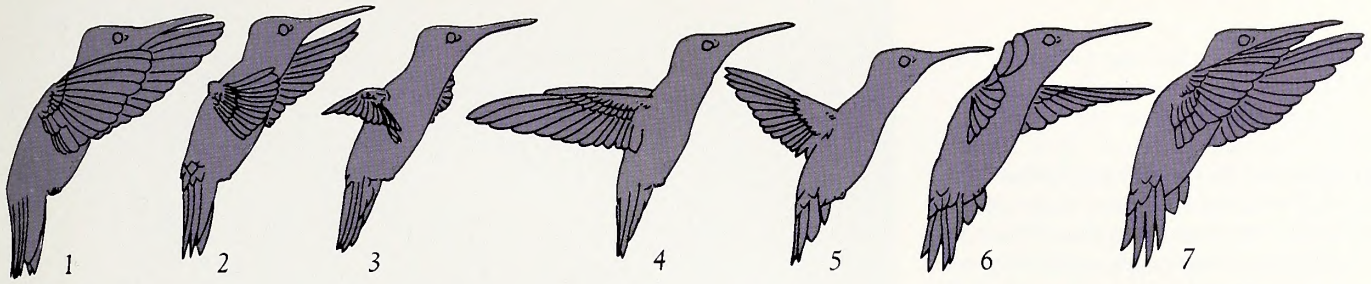
If food has been scarce and a hummingbird is forced to go to sleep without sufficient nourishment, it will go into torpor to stretch its energy reserves — even if it's not cold outside!

The hummingbird's second solution to maintaining its warmth is more conventional — it simply heads south for the winter. The ruby-throat migrates 2,000 miles from its breeding range in the Eastern United States and Canada to spend its winter vacation on the Yucatan Peninsula. It usually heads south with the first frosts of fall — early October in North Carolina — and returns around mid-April. During the week before departing on this incredible journey, the ruby-throat adds 50 percent to its normal body weight, all of it fat. This reserve fuel supply is crucial to the bird's survival, for it must cross the Gulf of Mexico on a 500-mile non-stop flight.

The ruby-throat's northern migration is timed to keep pace with the opening of its favorite flowers. This is risky business, since even in the southern states they face the danger of late-killing frosts. The birds show an astonishing toughness in weathering storms, cold and rain, but the death of the flowers they need for food is sometimes more than they can stand.

Soon after they get settled into their summer homes, it's time for the courtship rituals to begin. The courtship flight of a male ruby-throated hummingbird is an impressive sight to behold — even for the female hummingbird, who certainly knows something about flight. The male rises high in the air then swoops past the female within inches, rising again on the other side. He is careful to orient himself so the sun best shows off his flashy colors as he swings back and forth like a tiny iridescent pendulum, until the female is finally overcome by his charms.

Immediately after mating, the male flies



How They Hover

(after Greenewalt, Hummingbirds)

Based on high-speed photography, the illustration reveals the secret of the hovering flight of hummingbirds. The sequence begins with the bird's wings at the end of their frontstroke and perpendicular to the ground. As the bird begins its backstroke, it rotates its wings at the shoulder so that the leading edges are now pointing to the rear (3). The wing is moving upside down and horizontal to the ground. At (4) the wings are almost at the end of their backstroke, again perpendicular to the ground. The wings are now brought forward into a horizontal position, with their leading edges pointing to the front (6). This figure-eight movement of the wings keeps the hummingbird stationary.

Attracting And Feeding Hummingbirds

Since hummingbirds require such enormous quantities of food, the way to attract them is either by putting out artificial feeders or by planting a variety of flowering plants to which they are attracted.

If you want to attract hummingbirds with feeders you should put them out early in the spring, around the middle of April when the birds will be returning from their wintering areas. After natural food has become plentiful the birds tend to become "set" in their daily feeding routines and pay little attention to artificial feeders. But by midsummer when there are fewer blooms, hummingbirds visit feeders almost continuously.

Any glass vial is suitable for a feeder, but many companies sell bright red vials, or clear ones with red plastic flowers at the openings.

A solution made from one part honey to three parts water or one part sugar to four parts water can be used. Red food coloring can be added to the mixture. A honey-water mixture is probably far more nourishing for the birds than a sugar-water diet, but honey-water tends to ferment rather quickly on hot days and needs replacing every few hours. The fermentation can be retarded somewhat by using boiling water in mixing the formula, but once the solution has fermented the birds will refuse to drink it.

If you have seen hummingbirds feeding upon the nectar of flowers in your garden, hang your feeder near these natural feeding points. After the hummingbirds discover the feeder, it may be moved gradually to a window or some other vantage point. It should be kept in the shade, and you should keep it filled. Never fill a feeder with an artificial sweetener, such as saccharin. This could cause severe malnutrition, and might prove fatal.

Clean the feeder with warm water only, since soap may cause the syrup to drip from the opening of the feeder rather than forming a drop that will adhere to the tube. If ants become a problem, the limb or tree trunk leading to the feeder may be sprayed with an insecticide, and the cord from which the feeder hangs may be moistened with a few drops of cooking or salad oil. Care should be taken, however, to be sure that none of the insecticide gets into the syrup or on the feeder where it might poison the hummingbirds.

Hummingbirds accustomed to using feeders have often learned to remind their human hosts when they neglect their responsibilities. They have been known to follow people around the yard, often flying close to their faces when feeders are empty.

An abundance of flowers growing in the garden is the best way to attract hummingbirds, and such a wide variety of plants attracts them that few gardens are without some of their favorites. However, some plants that they especially like are listed below. So, when you plan a border or other garden plantings, make selections which appeal to hummingbirds. Also, give thought to blooming seasons, for overlapping blooming will provide a continuous supply of nectar. And, keep pesticide use to a minimum whenever possible.

To attract them may require a little planning and effort, but when one hears the hum of the wings, catches a glimpse of the shimmering colors and has a chance to marvel at the aerial acrobatics, it is all worth it.

FLOWERS
- Beardstongue
- Bergamot, bee balm, or Oswego tea
- Columbine
- Gladiolus
- Larkspur
- Petunia
- Scarlet sage
- Amarylliss
- Cardinal flower
- Evening primrose
- Four-o-clock
- Tiger lily
- Turkscap lily
- Milkweed
- Nasturtium
- Phlox
- Snapdragon
- Spotted jewel weed
- Thistle
- Impatiens (native)
- Indian paintbrushes
- Hollyhocks
- Geraniums
- Coral bells
- Cannas
- Rose mallow

VINES
- Trumpet creeper
- Japanese honeysuckle
- Cardinal climbers
- Coral or trumpet honeysuckle
- Jasmines
- Clematis
- Morning Glory
- Scarlet runner bean

SHRUBS
- Flowering quince
- Azalea
- Beauty bush
- Butterfly bush
- Lilac
- Rose of Sharon
- Coralberry

TREES
- Buckeye
- Chinaberry
- Mimosa
- Yellow or tulip poplar
- Black locust
- Horsechestnut
- Madonna tree

off into the sunset, leaving the female to build the nest on her own. The ruby-throat's nest is about the size of a walnut — so tiny that a soft-drink bottle cap will cover it. The female chooses her materials with the greatest of care, using fine down from plants like the milkweeds or dandelions or the wooly scales from fern stems to line the inner cup. Coarser materials, bud scales, moss, bits of stems, leaves and bark — are used for the bulk of the nest. The exterior is decorated with small pieces of lichen that camouflage and beautify the finished product. All of this is woven together with spiders' webs, which are also used to tie the nest securely to its twig support.

Jane Rohling

Hummingbird nests are very hard to find because they look so much like a knot on a limb that you don't even notice them. They are often located on fairly low, downward-sloping branches, often near or over water. Occasionally the location of a nest pleases the owner so much that she is reluctant to abandon the site and will build a new nest on top of the old one.

In North Carolina, the ruby-throated hummingbirds lay their first clutches of 1/2-inch eggs in May or June. Carl Buchheister says, "The eggs are always two in number and pure white, and the birds usually raise two broods a year. That's a pretty good rate of increase. If all of them lived, we'd be knee-deep in hummingbirds." But all of them don't live. Only one-sixth to one-third of them are reared successfully, yet large numbers of these attractive creatures survive.

After an incubation period of about two weeks, the young hummingbirds peck their way into the world — black, blind and no bigger than bumblebees. The length of time they will stay in the nest varies from as little as 10 to as many as 30 days, apparently depending on how frequently they are fed. And the feeding of baby hummingbirds is a fearsome spectacle to behold. The mother feeds them almost entirely on insects that have been partially digested in her crop. In what resembles a sword-swallowing act, she inserts her bill so deeply into the young birds that you'd expect it to come through the other side. She then pumps nourishment into them by regurgitating the food she has brought.

Although the young are fed mainly insects, the adults feed primarily on flower nectar, and like bees and other nectar-eating insects the hummingbirds provide a pollination service to flowers. Many of the flowers they frequent have evolved pollination mechanisms, such as special flower shapes or colors, specifically to attract hummingbirds. Extremely long floral tubes with nectaries at the end cannot be reached by most insects, limiting access to hummingbirds' long bills and tongues.

Studies show that a common flower color such as red is advantageous to both hummingbirds and flowers. It is an advertisement which attracts hummingbirds to sources of food as soon as they arrive in a new area. The result: the flowers get pollinated and the birds get fed.

Birds that have learned to associate red with food often investigate any red object they see. Buchhesiter related an incident at an Audubon summer camp in Maine: "We were on a field trip one day and we came across a shallow stream bordered by a very large area of cardinal flowers. There

Dr. and Mrs. R. Bird

were at least 40 hummingbirds going in and out, hovering at plants. It was an unbelievable sight. One of our staff members went in among the flowers wearing red shorts and soon had hummingbirds swarming all around her."

In spite of their love of sweets, hummingbirds cannot live on nectar alone. They have to supplement this carbohydrate diet with proteins, fats and vitamins, which they get from the minute insects and spiders they eat. In fact, some ornithologists believe that hummingbirds first visited flowers for the insects inside them, and developed their sweet tooth later on. Flies, gnats, aphids, tiny beetles and spiders are all fair game for

Kay Frazier

Hummingbird nestlings are tended only by the mother, who plunges her bill deep in their throats (left) to regurgitate nectar and insects. Two nestlings are the average brood, and they stay in the nest anywhere from 10 to 30 days depending on the food supply. Hummingbird nests are invariably well-made, bound together with spider webbing. Some favorite hummingbird flowers are: jewelweed (far left), Alamasco lily (left), and columbine (below).

Jane Rohling

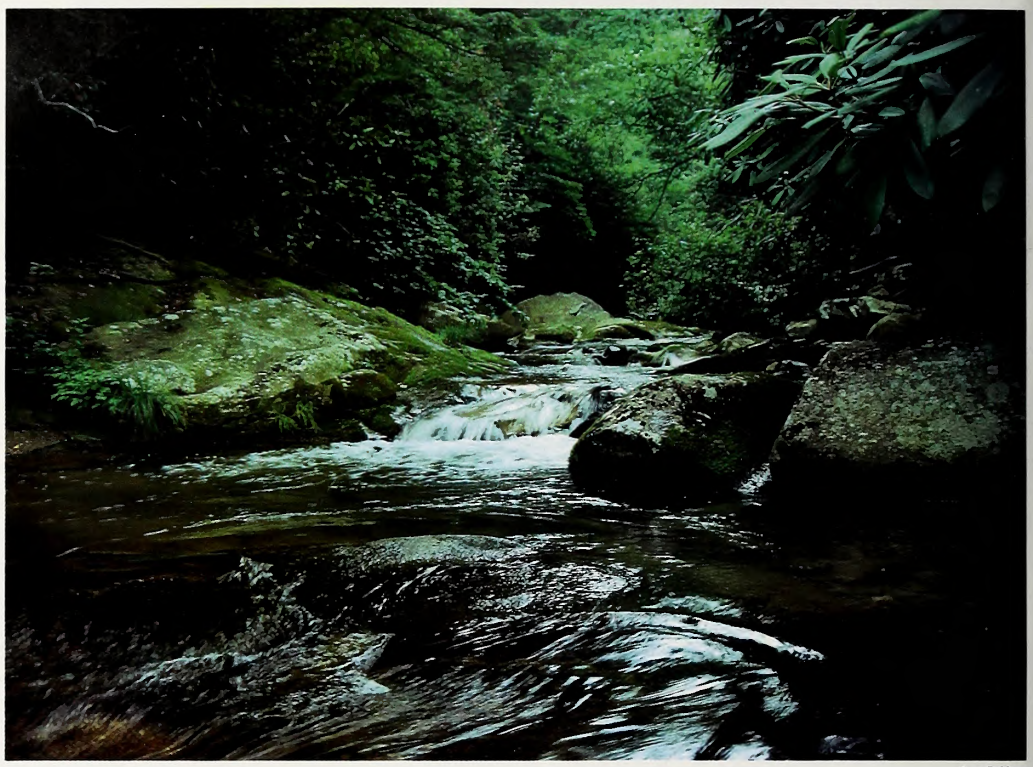
hummingbirds.

One might assume that tiny creatures which are adorned like jewels and frequent flower gardens would be peaceable by nature, but there is nothing peaceable about hummingbirds. The ruby-throat is a nervous, irritable little bird which resents any intruders into its territory. From the time the young leave the nest, they are about as likely to do battle with their mothers as with young from a neighboring nest. At feeders they are so determined to keep others away that it seems they'd rather fight than eat. And they'll attack anything — from bumblebees to hawks — regardless of size.

As with many wild animals, man poses the biggest threat to the survival of hummingbirds. In the 19th century hundreds of thousands of them were killed and shipped to Europe for use in ladies' accessories. In one week during 1888, over 400,000 hummingbirds' skins were sold at a London auction. Many species of hummingbirds were originally recorded by naturalists not in the tropical forests of South America, but in the shops of taxidermists and milliners, and some species probably became extinct before they were even identified.

Fortunately the fashions have changed and the capture and export of hummingbirds is prohibited in this country and many others. Now the greatest threat to hummingbirds is loss of habitat. Tropical forests, where many hummingbirds spend all or part of the year, are being destroyed everywhere they exist. Yet, even in the face of this threat, hummingbirds have a better prospect for survival than many birds because of their supreme adaptability. Some species have benefitted from the spread of agriculture and the multiplication of human homes surrounded by flower gardens.

These pint-sized birds that Audubon called "glittering fragments of the rainbow" are certainly as fascinating to study as they are beautiful to watch. So plant a few flowers, hang out a feeder, and invite hummingbirds to lunch. In return they'll entertain you with their antics and add a little color to your life. I'd say that's a pretty good return for a small investment.



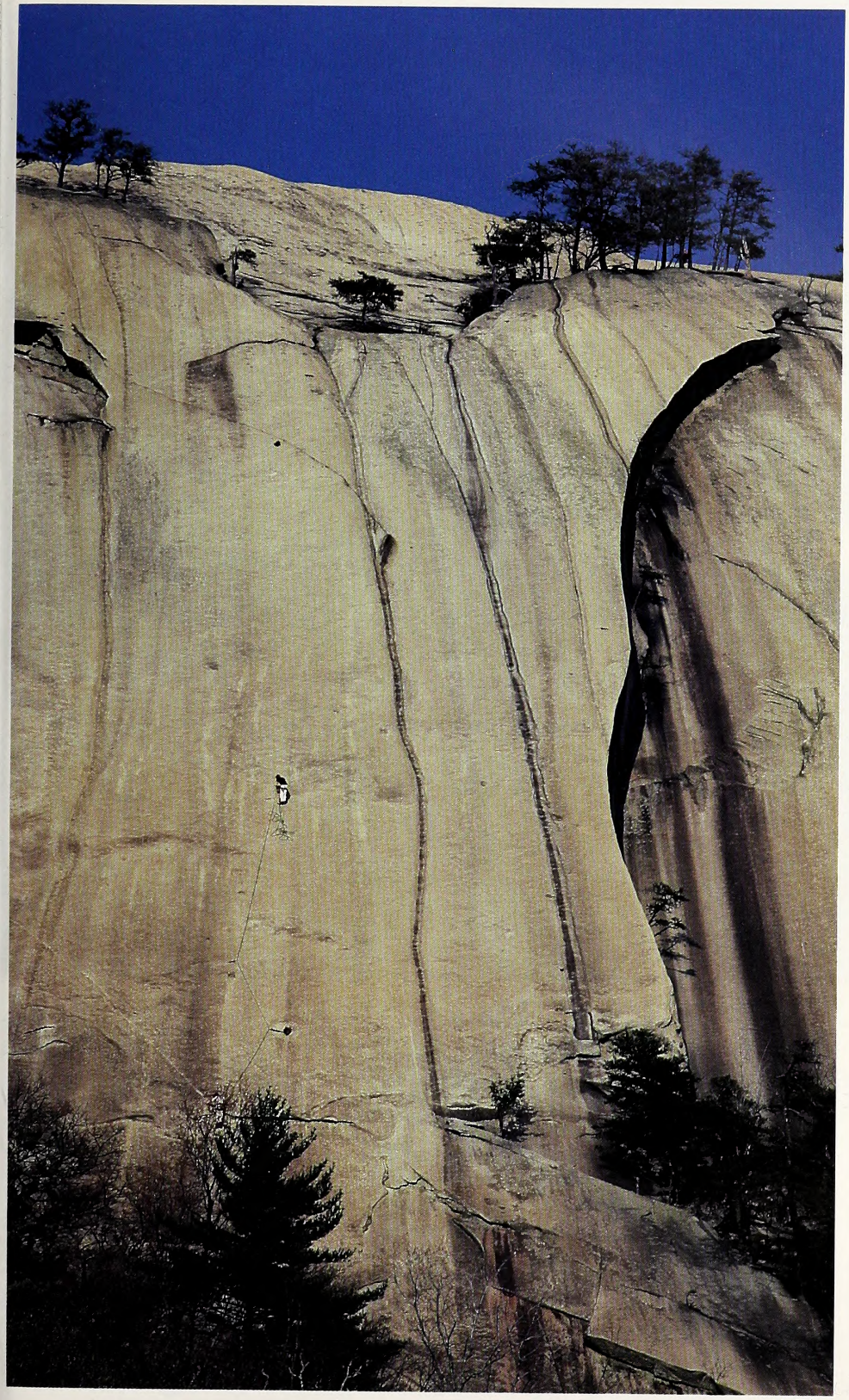
Jane Rohling

Cornucopia of fun, Stone Mountain offers something for everyone. There are pleasant streams for fishing, and pleasant people to meet. Hikers can also come across the chimney of an old farmstead, evidence of the widespread farming activity that once took place in the area. Looming over the landscape is the 600-foot face of the mountain.

John Widman

N.C. Parks and Recreation

Discovering STONE MOUNTAIN



John Widman

The rock climbers call it "Stone," after its challenging 600-foot granite ascent. Others are calling it a secret too good to keep. Whatever you call it, Stone Mountain State Park is fast becoming a popular spot — for many reasons.

by Terry Shankle

"Well, where is it?" I wondered as Joe Mickey and I drove along State Road 1002 following the new signs to Stone Mountain State Park. Joe was pointing out landmarks as we rode. I could see the green, cabin-studded ridges of the Blue Ridge Mountains rising toward summer storm clouds. I could see clear streams, dense vegetation and land as steep as a mule's face.

What I couldn't see was the mountain that gave the park its name, and since we were right on the edge of Stone Mountain Park I was puzzled. A mountain ought to be its own billboard, I was thinking, something seen for miles away such as Mt. Mitchell, or Grandfather Mountain or Pilot Mountain.

I remembered the Forsyth County den mother whose innocent and slightly mistaken question had provoked this trip. "You people have such a beautiful park up there at Stone Mountain," she had said. "My family loves to camp there. But why have you kept it such a secret?"

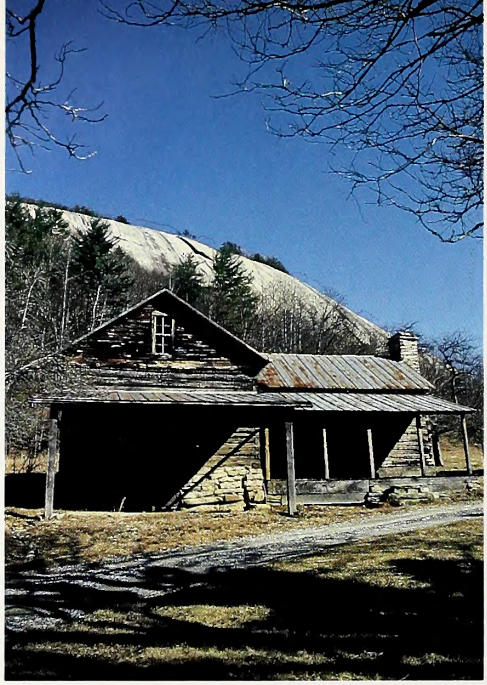
I had quickly reminded her that the park was operated by the Division of Parks and Recreation, not by the N.C. Wildlife Resources Commission. But her question seemed strangely appropriate now. If Stone Mountain was a secret, no wonder — you couldn't see the blamed thing!

We turned at the eastern park entrance at Elk Spur Church and drove farther. I was traveling with Wildlife Commission biologist Joe Mickey because he assists the park in managing the trout fishing streams that lie within its boundaries. He also gives programs on the park's trout fishing opportunities to groups of campers during the summer. He pointed out the new construction that was underway at the park as we drove along a newly built segment of road ready for paving. "They've been doing a lot of building up here recently," he was saying. "They've got a new maintenance building, a campground with a modern washhouse under construction, and a new parking lot near the base of Stone Mountain."

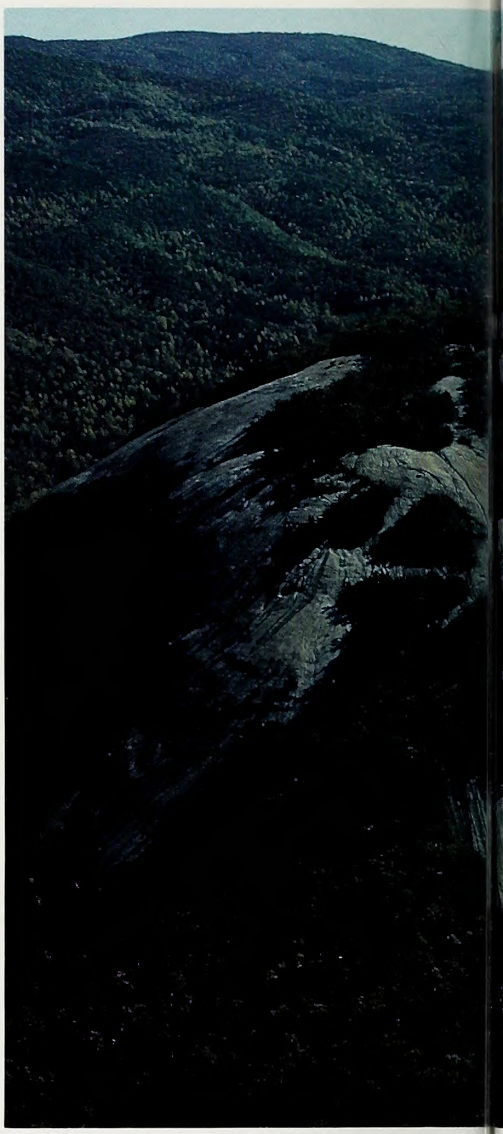
I couldn't stand it any longer. I felt like the lady on television in the hamburger advertisement, only instead of saying "Where's the beef?" I blurted out, "Where's the mountain?"

"We're getting there," Joe said. He turned up a narrow winding road that

Over 17 miles of trout waters lie within Stone Mountain State Park, and the Wildlife Resources Commission stocks some of the waters every 10 to 14 days. At the base of the mountain is the old homeplace (right) of James Hutchinson, the park's first ranger, whose family donated the cabin to the park. Aerial photograph of Stone Mountain shows the light-colored granite showing through the vegetation.

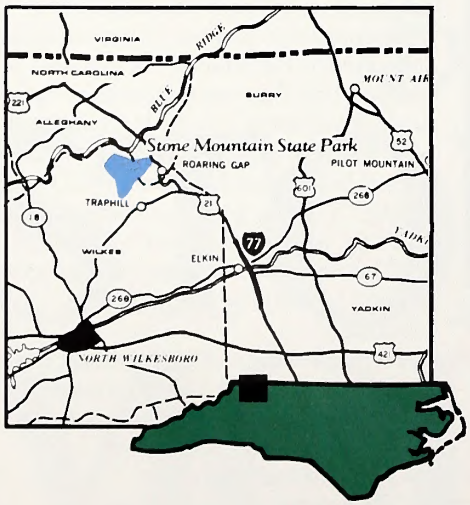


Terry Shankle



Terry Shankle

Getting To Stone Mountain

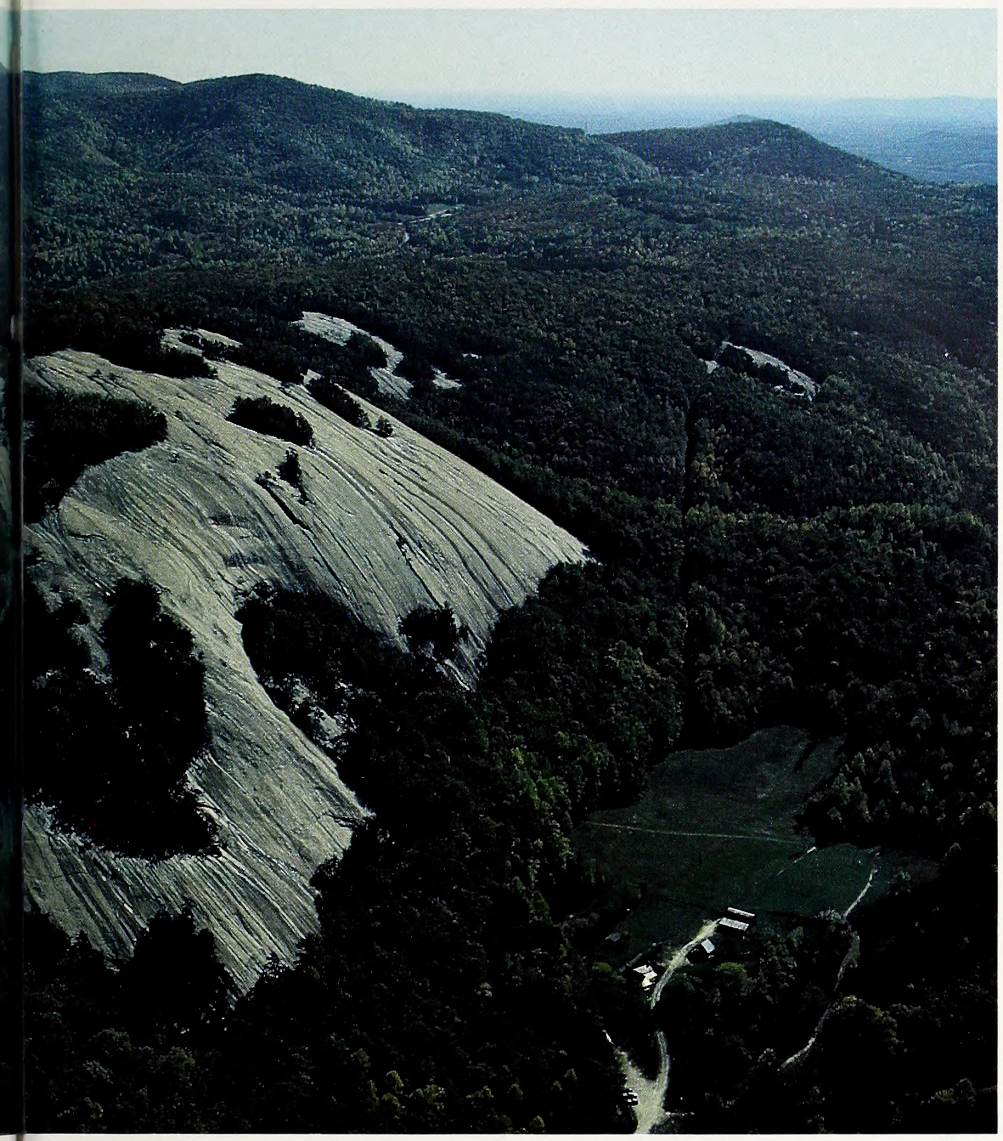


Stone Mountain is near I-77 north of Elkin. It is easily reached from the Piedmont by taking I-85 to I-40 north at Statesville. From the Charlotte area take I-77 north. From Hickory and west take I-40 east to Statesville and then I-77 north. Just north of Elkin take U.S. 21 north towards Sparta. After approximately eight miles on U.S. 21 look for the sign directing you toward Stone Mountain State Park.

Camping enthusiasts have several alternatives at Stone Mountain. In addition to 37 new campsites at the new campground-washhouse complex, there are 15 primitive campsites at various locations along the road that loops through the park. The 37 new sites cost $5 per day per site with a dumping station for RV's and water spigots nearby. The primitive sites cost $2 per day per site.

For the backpacker there are six sites at various locations up Widow Creek. Backpack camping is only permitted at the designated backpacking sites and each site cost $2 per day.

Campsites are available on a first-come, first-served basis. The only camping reservations that can be made are for the one group camping area which has a shelter. The site can accommodate up to 30 people and cost $.30 per person per day or a maximum of $3.00 per day for the entire group.



Ken Taylor

quickly brought back memories of the dirt roads in Yancey County where I was a wildlife enforcement officer for six years. "We've already driven completely around the north side of the mountain but the trees obscure any view from down here on the creek."

Within minutes Joe and I had parked at a small parking area near some picnic tables, walked one of several marked trails that took off in various directions, and entered a small, picturesque meadow complete with a house and barn that had obviously been a farm in the recent past. There, towering 600 feet high, was the gray granite dome known as Stone Mountain.

"Well," I said, "That's worth waiting for."

That's what a lot of people have been saying since Stone Mountain was established as a park in 1968. The park had several movers and shakers who recognized the potential of the site, and corporate angels who donated much of the land. Doris Potter, Claude Billings and Alfred Houston were impressed early on by the beauty of Stone Mountain, and they pushed for a park. But in the late 1960s it and much of the adjoining acreage was owned by the North Carolina Granite Corporation of Mt. Airy. After meetings with Billings, the president and vice-president of North Carolina Granite Corporation, John P. Frank and Frank Smith, agreed to present to their board of directors a plan that would donate Stone Mountain to the State to be used as the focal point of a new State park. The donation was approved and 418 acres including the mountain became the seed of Stone Mountain State Park. Later the corporation sold an additional 1,068 acres for the park.

By 1970 over 2,100 acres of land had been obtained for Stone Mountain State Park, and no State money had been used. A decade and a half later, 9,000 more acres have been added to the park. Federal grants funded much of the land acquisition, while Philip Hanes Jr. of Winston-Salem gave generous donations of land to the project. The park has been essentially put together with very little State money.

Today, bounded on the north by the Blue Ridge Parkway and on the west by the Thurmond Chatham Game Lands, the more than 11,000 acres of Stone Mountain State Park offer opportunities for outdoor activities of all kinds. Camping, fishing, rock climbing, hiking and picnicking are available, and interpretive programs are available during the summer months. Stone Mountain may once have been a secret known only to a few, but it's fast becoming one of the jewels of the State Park system.

Joe and I were interested in exploring one or two of the trout streams, but before we did we wandered the southern base of the mountain where we found rock climbers practicing their techniques on the tremendous boulders that were once part of the mountain. Now shaded by large trees, the boulders offer a cool place to practice during the heat of summer.

Rock climbing on the 600-foot granite dome is probably the most popular feature of Stone Mountain. The sheer rock face offers experienced rock climbers one of the most challenging experiences to be had on the East Coast. Ascent routes with such names as "Fantastic," "Great White Way," "Mercury's Lead," "No Alternative," "The Great Arch" and "Grand Funk Railroad" have become widely known as providing some of the best "friction climbing" anywhere. Friction climbing is a method of ascending a smooth and steep rock face by searching for small cracks or hollows that will serve as footholds. Climbers are secured by ropes, but they get to the top by balancing their weight on all fours. (See "I Climbed "The Great Arch")

Stone Mountain's granite dome was first climbed in 1965 by Fess Green and Bill Chatfield using a south face ascent. Since then, 13 routes have been established on the south face and all are equipped with climbing bolts and hangers anchored in the rock at strategic points to aid the climbers.

Most of the climbing bolts were placed in the rock under the guidance of Mike Fishchesser who is affiliated with the N.C. Outward Bound School in Morganton. Mike is also responsible for the display of rock climbing equipment located in the meadow at the southern base of the mountain.

Climbing on the more rugged north face is not encouraged. It is also not wise to

Moonscape effect appears on the summit of Buzzard's Rock, where over the years wet-weather springs have carved potholes and craters in the tough granite. Climber pauses to examine the next step in her ascent of Stone Mountain (facing page, top). The steep, sloping rock face is one of the premier challenges in the Southeast for rock climbers. Thirteen rugged routes cross the rock to the top, all of them equipped with climbing bolts. Climbing Stone Mountain requires special shoes (far right), and is not for beginners.

Terry Shankle

I Climbed "The Great Arch"

A wet and slippery piece of greased lightning — that's how I'd describe that tiny section on the fourth pitch of "The Great Arch" where the water runoff tracks down the granite face. Crossing the runoff didn't seem to be that hard, but I hadn't even begun to solve the problem when I found myself falling. When you're falling on a sheer rock slope 370 feet above the ground it's amazing what goes through your mind!

Like most rock climbers, my partner Danny and I had wanted to climb "The Great Arch" at Stone Mountain. It was my first trip to Stone and I had heard of the Arch's reputation as a classic climb. The route arcs 520 feet up the granite face of the mountain. There are four "pitches," or sections to the climb, each about the length of a 150 foot rope. The books said it had a beautiful view.

Throughout most of the Great Arch the climber is following a crack formed by two slabs of rock meeting at a 90 degree angle, a "dihedral" as climbers call it. About 100 feet from the top, however, the dihedral disappears and it's pure friction climbing from then on. The Arch is one climb at Stone Mountain where a beginner can get the feel of friction climbing without having to rely on it entirely.

Friction climbing is rock climbing on steep, smooth slopes where there are no hand or foot holds to speak of, just varying degrees of steepness in the rock. It's like walking up a steep roof and hoping your feet don't slip on the shingles. By keeping his center of gravity away from the rock, the climber can direct his weight down into the rock and stay balanced.

The first pitch took us to a tree ledge about 140 feet above the valley floor. Danny was the lead climber and as he went along, he placed small metal wedges called "chocks" into crevices at intervals of 15 or 20 feet. The rope that he was tied to was passed through a metal loop called a "carabiner" attached to the chock. I was below with the rope wrapped around my waist and letting out slack as Danny went higher. If he fell he would only fall past his last wedge. I was the belayer, anchoring the rope to stop his fall.

When Danny reached the ledge he "belayed" for me, wrapping the rope around his waist and keeping it taut until I arrived. From here we began the second pitch, working up the dihedral. I had to reach my hands down into the crack and pull out while at the same time pushing in with my legs in a maneuver called a "layback." It's this counter-stress that keeps you on the rock. It also puts an enormous strain on your bent back. And if you're just slightly scared, you tend to strain, to push and pull a little harder and pretty soon you're exhausted. The worst thing a climber can do is to get half way up and not have the strength to continue. About half way I was drenched with sweat and my knees were shaking faster than a Singer sewing machine. I couldn't care less what the view was like. I managed to reach a little pine tree and from there I could see the end of the pitch, a tiny ledge where I stopped to rest.

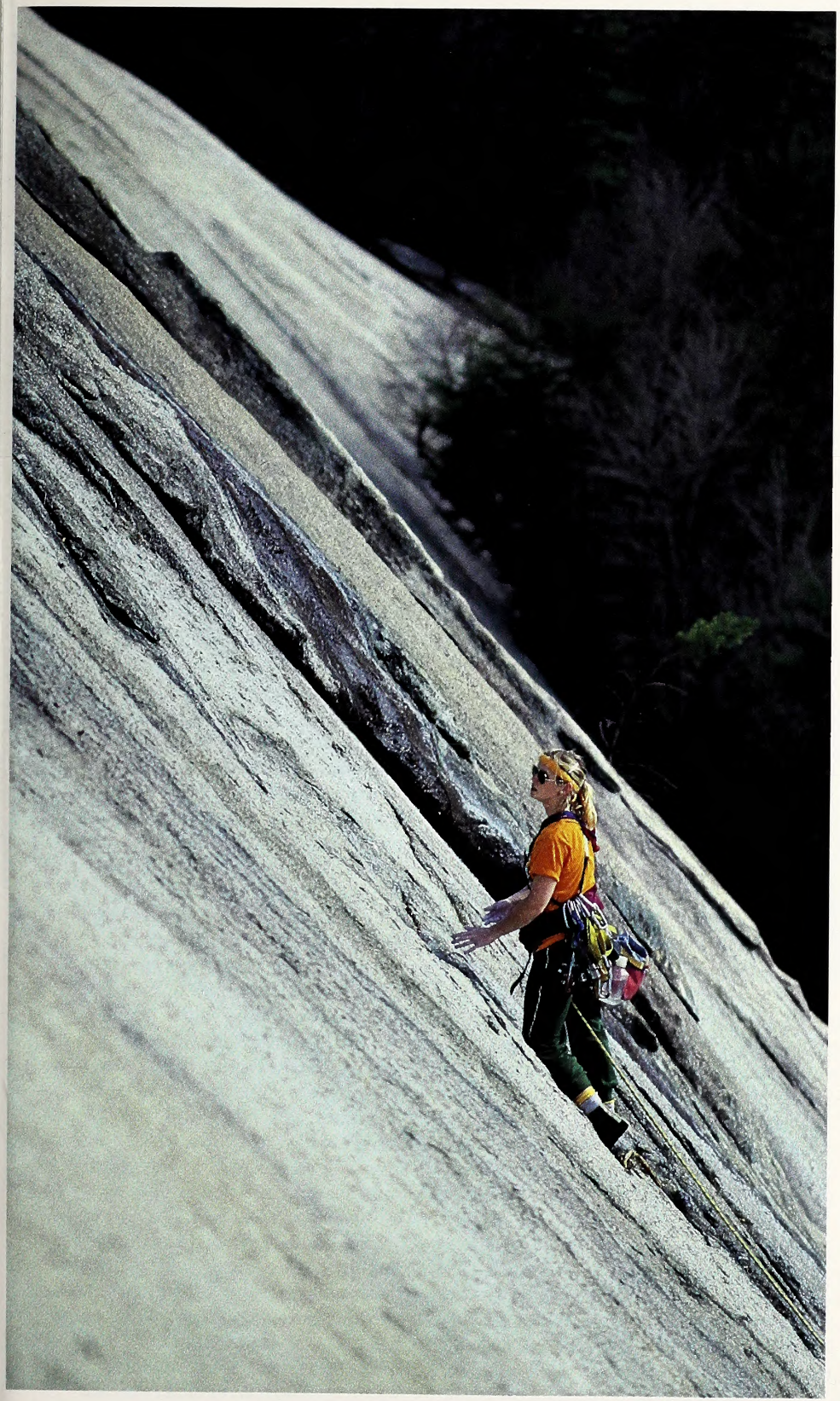
The third pitch wasn't bad. Actually I don't remember much of that 100 foot section because what happened next overshadows almost all my recollections. I wanted to be the lead climber on the final pitch. That was easily arranged.

I started climbing the last part of the dihedral. About 15 feet above my partner and a small pine tree, I stepped onto the slick rock. The next thing I knew I was falling. I hadn't climbed far, hadn't even put in my first chock so I was in for a good 30-foot fall. But I wasn't thinking about that. It's not often you can take a fall with a positive attitude, but that's exactly what I had. I knew that tree was just below me and I was thinking to myself, I can catch that tree! As I slid past my partner I curved my arm around that little Scotch pine and just hung there. I was so delighted I couldn't stand it!

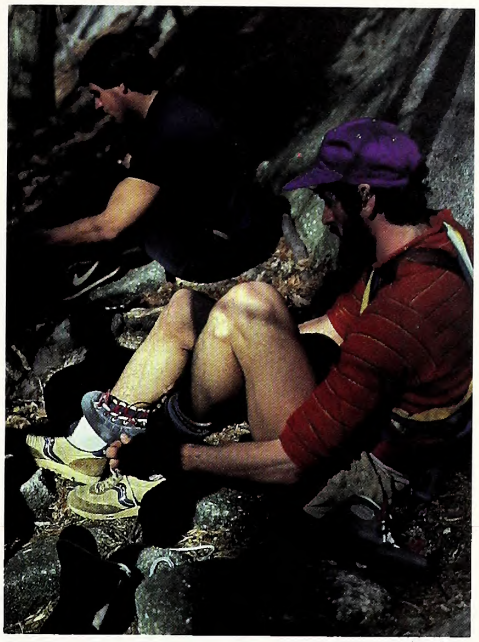
Above me I could see Danny, all braced and ready to be wrenched off his perch and onto the rock when I reached the end of the slack. Like a good belayer, he was ready to fulfill his commitment, ready to stop my fall. His eyes were closed but when he finally opened them and saw me swing from the tree, I think his smile matched mine. I pulled myself onto the ledge where he was, we changed leads and finished the climb.

Sitting on top of Stone Mountain we felt like kings. Exhausted and chilled, we watched deer meander onto the field below us. Then the sun set and we left the mountain and went home.

— John Widman



John Widman



John Widman

start climbs three hours before the closing of the park. This regulation is because climbers must be off the mountain by closing time. Climbing should only be on the established routes and by experienced climbers using proper equipment. Also, the mountain is closed to climbing when the rock is wet. Observance of these safety rules has kept accidents to a minimum in nearly 20 years of climbing.

There is no charge for climbing at Stone Mountain and in fact rock climbing is officially still on a trial basis according to park rangers. Climbing was stopped at one point in 1973 but after a demonstration of proper climbing techniques for then State Parks Superintendent Tom Ellis, climbing was resumed.

A climbing log, documenting many of the first climbs on Stone Mountain, may be read at the park office. The log encourages climbers to add their stories of climbing Stone Mountain so that others, particularly new climbers, can learn from their experiences.

For those who prefer slighter flatter terrain for their outdoor excitement, there are several well-marked hiking trails that wind through the park. One of them, three and a half miles in length, goes across Stone Mountain and because of slope variations, is best traveled from west to east. Other trails, of various lengths, wind to the top of other granite exposures with names like Cedar Rock, Wolf Rock, Buzzard Rock, and Hitching Rock.

The summits of these "rocks" offer spectacular views of the surrounding countryside. They also present the curious observer a graphic lesson in the effects of the elements on solid rock that take place over millions of years. Small potholes and craters dot the flatter areas creating a moonscape appearance. Wet-weather springs continue to carve troughs in the

N.C. Parks and Recreation

Campers have a variety of opportunities at Stone Mountain. There are 37 new campsites plus 15 primitive campsites at locations along the road. Backpackers can stop at six sites along Widow Creek.

granite while lichens cling tenaciously to the weathering gray rock.

Three water falls are located on Big Sandy Creek, and are only accessible by trail. Beauty Falls, or Upper Falls as it is often called, is a spectacular site where Big Sandy slides down a nearly vertical granite face over 200 feet high. Farther down Big Sandy you encounter Middle Falls and Lower Falls.

Caution should always be taken on any of the hiking trails and near the water falls. They are often steep and rocky with slick areas caused by running or splashing water. Proper hiking footwear is advised and steeper rocky ledges avoided. Hikers on high places should also be constantly aware that others might be below them and never throw or dislodge rocks that might tumble down the slope.

As Joe and I continued our trip through the park it was apparent that amidst all the improvements that were being made, Stone Mountain State Park retained the rural "feel" of the area. Abandoned farms complete with houses and outbuildings were scattered throughout the park. "Three of the park's four permanent full-time rangers live in houses that have come into park ownership when the adjoining land was purchased and added to the park," Joe said. Several rock chimneys stood as silent reminders of the rugged people who made a living farming and logging the area during past generations.

Trout fishing is the next biggest attraction at the park after rock climbing. Over 17 miles of designated trout waters lie within the park boundaries and over the years Joe Mickey has spent many hours assisting the park with the management of the trout fishing.

"Garden Creek, Widow Creek, and the parts of Big Sandy Creek that are inside the park are designated as Native Trout Water where only single hook artificial lures may be used," Joe said as we stopped to ask a fisherman about his success that day. "The daily limit is four fish only one of which may be longer than 10 inches. The other three must be between 7 inches and 10 inches in length. Rainbow and brown trout dominate the lower parts of the streams while brook trout inhabit the higher, cooler stretches of water."

The fisherman had three rainbow trout that, to Joe, were obviously stocked fish.

"The East Prong of the Roaring River, the stream we're beside now, runs beside much of the park road," Joe continued. "It is a stocked stream and is classified as General Trout Water where any type bait may be used and there is no minimum size limit. The daily creel limit is seven fish. The stream is part of the Wildlife Commission's intensively stocked program and receives fish during the trout season every 10 to 14 days. For this reason the East Prong is heavily fished, particularly during the early part of the season which runs from early April each year through February of the next year.

"One trout stream in Stone Mountain State Park is being managed as a fish-for-fun stream and special regulations apply. Bullhead Creek and its upper tributary Rich Mountain Creek can be fished using only flies having barbless hooks. All fish must be released and a fee of four dollars per day per fisherman is charged by the park. The stream is divided into eight sections and fishermen can only fish their assigned stretch of water. The project has proven quite popular with fly-fishing enthusiasts and is a great place to teach or practice fly-fishing techniques," Joe concluded.

We ate supper that night at a picnic table under a large apple tree in front of the park office. When we left we could see the area fill with deer. They munched on the early falling apples. Besides the abundant and visible deer herd, other wildlife species can be seen at Stone Mountain. A colony of beavers has created several ponds inside the park on the lower part of the East Prong of the Roaring River, creating excellent habitat for many birds and animals including wood ducks. Buzzards are often seen circling the rocky peaks while at lower altitudes hawks circle the abandoned fields searching for food.

One strange sight sometimes seen by hikers around Stone Mountain is a small herd of goats. Once part of a herd owned by James Hutchinson, the goats run wild around the Hutchinson homeplace which still stands at the southern base of the mountain. After the family left the area, the goats took up on the rocky dome and a few descendants still can be observed at times walking the steep slopes.

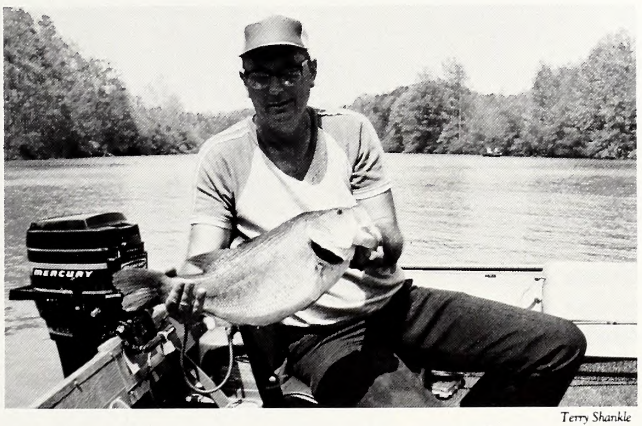
As Joe and I left Stone Mountain State Park that summer's night, I thought back on the entire afternoon. I remembered the rock climbers, trout fishermen, hikers, photographers, campers, picnickers and sightseers. It was obvious that Stone Mountain was no longer a secret. And with expanded picnicking facilities planned for 1984, along with a new park office, the park will surely be attracting even more people. Perhaps someday soon that Cub Scout den mother from Forsyth County will plead with me to keep quiet about Stone Mountain. "It's a secret," I can hear her saying, "And we want to keep it that way!" ⊠

WHY LAKES GO BOOM

It's no accident that new lakes offer the best fishing. The cycle is both natural and predictable.

by Jim Dean

The word spread quickly last spring despite feeble attempts by some fishermen to keep it quiet. "Listen, don't go telling the whole world, but I hear they've been mopping up on crappie the last week or so at Jordan," a friend told me when I ran into him in the supermarket. "The crappies aren't as big as they're gonna get, but they're already eating size, and some are much bigger."



Terry Shankle

"What about the bass?" I asked as I tossed a box of cereal into the cart.

"Plenty of them, but most are less than a foot long," he answered as he shifted his cart to let some people pass. "I've heard of one or two in the 4-pound range, but they're not common."

A man caught in the cart jam next to us smiled and spoke up. "You're talking about Jordan Lake, right?" he said. "Me and my buddy were over there last Saturday and you couldn't hardly get a boat in the water for the crowds but we caught dozens of bass, although they were almost all much too small to keep."

The word was obviously getting around. Jordan was hot, and it was going to get hotter. And 13,900-acre B. Everett Jordan lake, west of Raleigh, was not the only lake that was beginning to offer good fishing. Stretching from northeast of Raleigh to Durham, Falls of the Neuse Lake flooded 12,490 acres, and southwest of Raleigh was yet another new lake, the 4,000-acre Shearon Harris Lake which would be used to cool the nuclear power plant.

Ever since it became clear that three large lakes in the Piedmont would be completed and flooded within a few years of each other, fishermen in the state have been waiting with baited hooks. Good fishing — perhaps even outstanding fishing — has been expected at these lakes during the coming decade. It's a widely known phenomenon that usually occurs in new lakes, and experienced anglers have learned to anticipate it.

Yet, not everyone knows why new lakes go through "boom" stages. Why is the fishing often so good in new lakes, and why does that fishing usually peak during the third to seventh year after the lake is flooded? More important, perhaps, why does the fishing often decline rapidly after the first seven to 10 years?

And while we're asking questions, why is it that some lakes continue to offer decent fishing for years and years following

Jane Rohling

that initial "boom" stage, and why do others never have good fishing again after the "boom" passes?

Good questions, all of them, though some are easier to answer than others. The initial period of hot fishing is perhaps the easiest to understand because it is largely caused by one factor — lots and lots of fish.

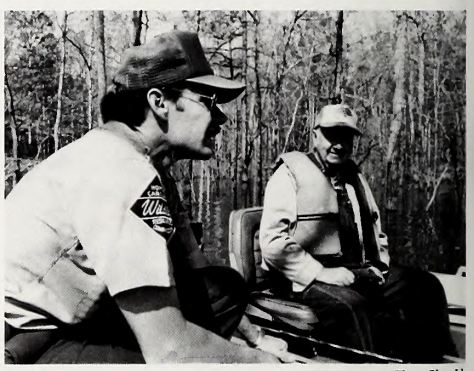
When a lake like Jordan is filled, the newly stocked bluegills, bass and other species grow rapidly because the recently flooded ground is incredibly rich. Also, even if the new lake contains adult fish from the flooded river, streams or ponds, these fish suddenly have many times more space to live in, and are not so numerous that they can eat a significant number of the newly stocked fish. Growth rates are incredible, and the fish soon reach spawning age. Because there are so many ideal spawning spots, so few larger predators and so much brushy cover to hide newly hatched fish, the survival of the newly spawned fish is very good.

The first year that the newly stocked fish reach maturity is usually the best spawning season, but reproductive success and survival will usually remain high for several years before it begins to drop. As long as the huge populations of fish from these first few successful spawning years are present, the fishing is likely to be terrific. When those year classes die, the initial boom period of fantastic fishing is over. Worse than that, most likely the fishing will never again be as good as it was those first six or seven years.

Many fishermen remember those early peak years of fishing and wonder what happened. Actually, the decline is normal. In fact, during those peak years of fishing, a new lake is carrying an unnaturally high game fish population — more than it can actually support over a long period of time.

"After those first few years, several things begin to happen," explained Fred Harris, program manager for the N.C. Wildlife Resources Commission's Division of Inland Fisheries. "The fish from that first big-year class begin to get large enough to feed on the more recently spawned fish. Also, the rich mixture of decaying vegetation that created so much food for small fish has largely rotted away, and so has a lot of the larger cover like brush and small trees. This means that young fish grow more slowly in the face of greater competition for food, and they have fewer places to hide from the larger predator fish. With less food and more predation, fewer of the newly hatched fish survive to become adults."

Basically, you can predict what will happen. During the first three years or so, fishermen will catch lots of fish, but most will be fairly small. In the fourth and fifth



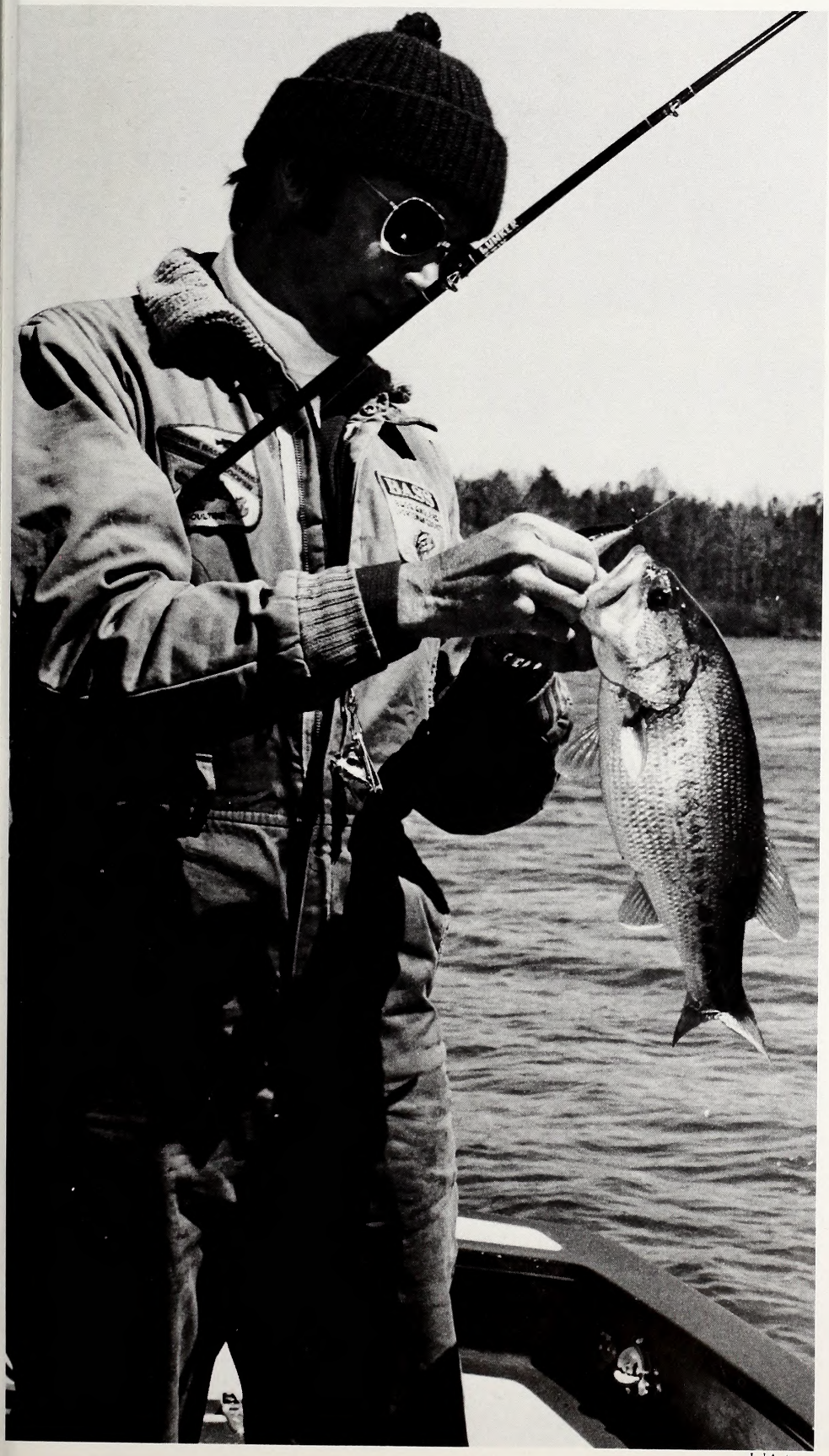
Terry Shankle

years after flooding, bass up to the 4-to 6-pound class may be rather common because there were so many left from that first year or two of successful spawning. Finally, in the sixth, seventh and eighth year after flooding, you'll still catch lots of fish of all sizes, and there are likely to still be a good number of big bass left from the early years. At the end of the boom cycle — eight to 12 years after flooding — the fishing almost always drops off, especially the numbers caught.

"That cycle can vary, of course, depending upon a number of influences," said Harris, "but in a general sense, the boom period is a fairly predictable sequence. Sometimes it's shorter; at other times it may last longer."

Bass fishermen probably notice the peak and the subsequent decline more readily

"Because there are so many ideal spawning spots, so few larger predators and so much cover to hide newly hatched fish, the survival of young fish is very good in a new lake."



Joel Arrington

Free boating access ramps at Jordan Lake (far left) are excellent, and they're already seeing a lot of traffic. Wildlife enforcement officers are also working overtime to make sure that fishing and boating regulations are not violated on the new lakes. In the early years, especially, many of the bass will be small, but nicer ones like this largemouth (near left) are already being caught.

that other fishermen, and to some extent, they can plan their fishing to coincide with the peak years.

When the Tar River Reservoir was in its peak cycle a few years ago, Mike Gaddis and I fished it several times and it was no trouble to catch a lot of nice bass. But with each passing year, the situation changed. We caught fewer, but larger bass. Finally, the bass fishing dropped off to the point that we began to go elsewhere.

Tom Earnhardt and I experienced an almost identical sequence on Hyco Lake during its peak years. The fishing was excellent for several years, but when the boom period was over at Hyco, the decline was even more dramatic than in most lakes.

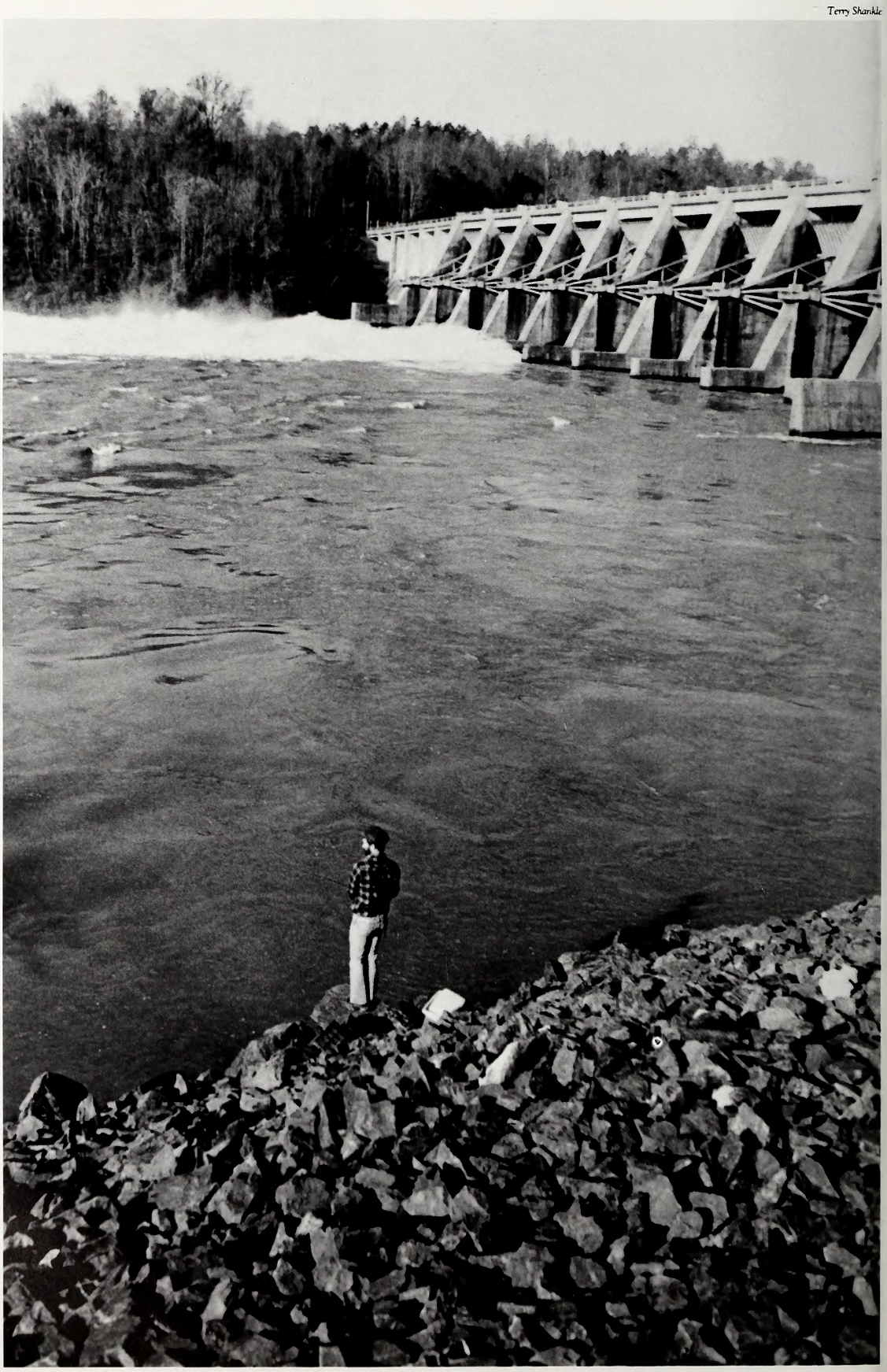
Not all lakes suffer such a dramatic decline as Hyco, and there are a number of reasons for that. Both Kerr and Gaston lakes on the Roanoke River watershed went through typical peak periods during the first decade after they were impounded, and although the fishing did decline, it has remained fairly good over the years. There have even been some periods when these lakes went through later cycles of good fishing — though never quite as good as the first "boom" period.

"Some lakes are just richer or better suited in other ways to providing consistent fishing," explained Harris. "Both Kerr and Gaston have proved to have capability of providing decent fishing over a long period."

It would take a book to explain all the reasons why some lakes have greater capability of maintaining good fishing than others. Obviously some of those factors are size, number of tributaries, bottom contour, depth, fishing pressure, water level fluctuations, acidity, and pollution to name just some of them. Hyco, for example, has been hurt by pollution.

"At the end of the boom period—8 to 12 years after flooding—the fishing almost always drops off. It's a natural part of the cycle."

Terry Shankle



Not all the action takes place in boats on new lakes. Frequently, bank fishermen can score big catches on panfish and bass because there is an unusually high population of fish in a new lake during the first decade after impoundment.

Jane Rohling

Jim Dean

Even fishing pressure — once thought to have little impact — is being reassessed. Studies have shown that under certain conditions, it is entirely possible for intense fishing pressure to reduce numbers of large fish in some species — especially larger predators such as bass. That's one reason minimum size limits for bass have been increased in North Carolina recently.

One problem is that large impoundments cannot be managed as easily as farm ponds. If the only purpose of Jordan Lake, for example, were to provide good fishing, you could draw it down in the winter months to concentrate the fish, then flood it to above normal levels to create better spawning conditions throughout the spring. You could even drain it and start over again — a fairly common practice when a farm pond goes bad. But of course, you can't do that with a lake that provides water for an entire region and also serves as a flood control project as well. Recreational fishing is only one benefit for such a lake, and rarely do those who own the lake consider good fishing as important as providing water for drinking and industry.

"Fisheries biologists would dearly love to be able to manage a large lake purely for fishing," said Harris. "As far as I know, it's never been done anywhere in the country simply because fishing is a lower priority.

"Unfortunately, biologists and agencies like our own Wildlife Resources Commission often get wrongly blamed for any decline in fishing whether it's a natural cycle or whether it's because fishing is not the primary use of the lake," added Haris.

"The most common thing we hear is that we ought to restock a lake where the fishing is dropping off, but the answer is not so simple. Take largemouth bass for example. Almost invariably, the problem is not that there aren't enough real small bass, but that so few survive to reach 6 inches. Therefore, to make a favorable impact, you'd have to stock many thousands of 6- to 8-inch bass.

"To raise enough bass to that size is not simple because you'd need extensive raceways to keep them all the same size as they're growing. Otherwise, they eat each other. It's a tricky matter that is also very expensive and, of course, there are so many other factors which influence fishing success. That's why the size and creel limits are still the best way to manage large impoundments, and it's fairly effective."

In recent years the North Carolina Wildlife Resources Commission has gone to a daily creel limit of eight largemouth bass, and no more than two bass less than 14 inches can be kept as part of that daily creel (exceptions are listed in the regulations). Variations in an 18-inch minimum size limit are also being studied on two small lakes — Cane Creek Lake in Union County and Lake Thom-A-Lex in Davidson County.

But since fishing pressure is only one factor — and usually a small one, at that — in the long-term productivity of a lake, anglers who understand the natural cycles of a lake will always have an advantage over fishermen who don't.

And for the next few years, the cycles on Jordan, Falls and Harris should be up. Indeed, it is likely that the best fishing these lakes will ever provide will take place over the next few years.

You'll have to cope with some crowds, of course, but that seems to come with the sport nowadays. So what are you waiting for? To paraphrase Navy jargon, "Gentlemen, the fishing lamp is lit."

The Lake's Full, Now What?

It takes careful planning and stocking to get a new impoundment off to the right start. Here's what biologists have done at the Triangle's newest big three—Jordan, Falls and Shearon Harris.

by Mark Taylor

"You ought to come down this way — the fishing is really hot," I said. "We could take out my canoe and slay the bass and crappie."

The voice on the other end of the phone didn't sound convinced. One of my regular fishing companions had recently moved to Sylva, and wasn't about to be easily dislodged from his newly discovered mountain trout streams.

"The last time I visited we ended up catching 3-inch bream in the pond at the end of your street," he replied. "That's hardly great fishing. You'll have to do better than that if I'm gonna drive all the way to Raleigh."

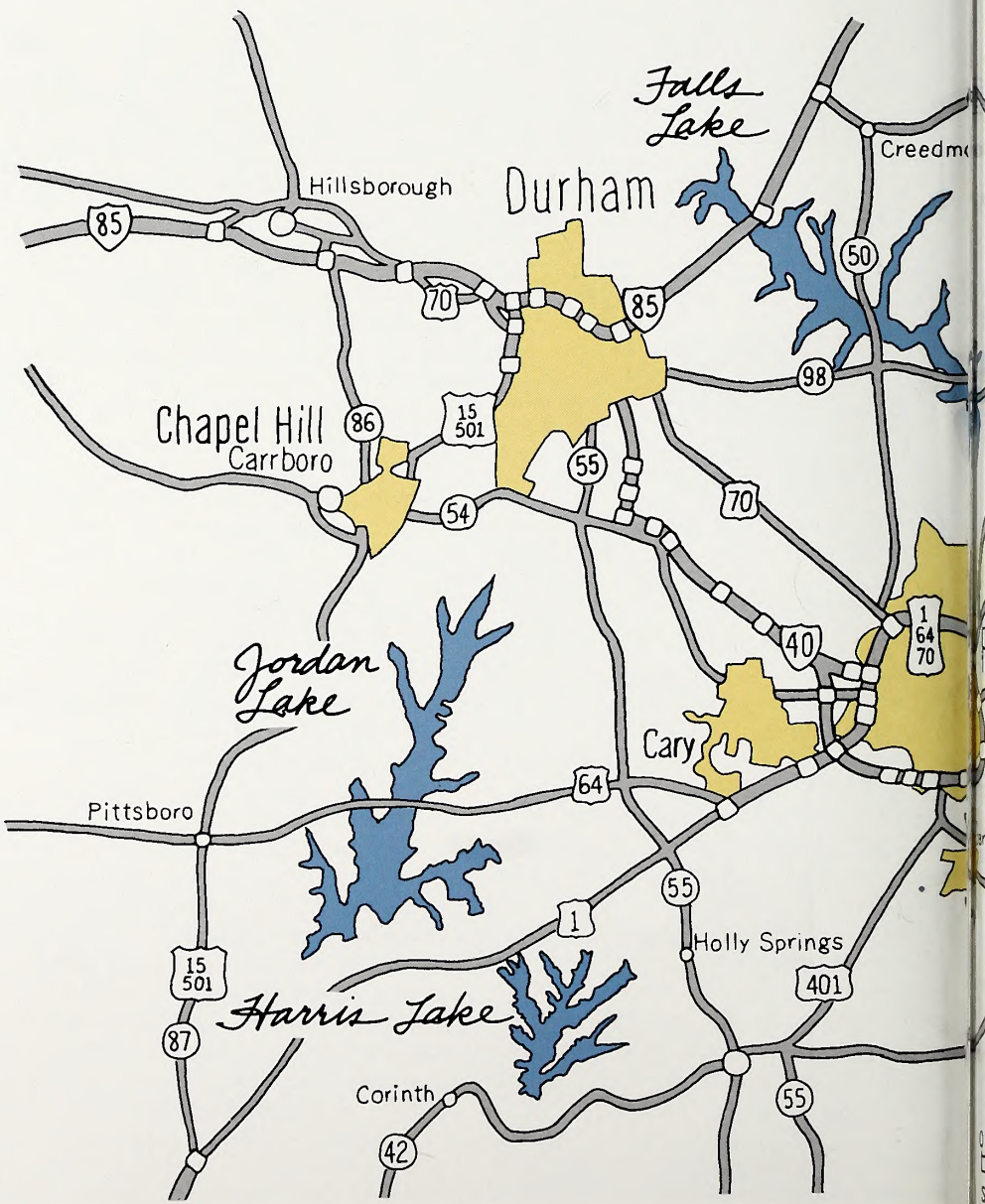
"That was last year," I said. "This year is a different story."

Indeed it is. My friend still hasn't come down to Raleigh for his flatland fishing trip, but when he does I am confident he won't be disappointed. In the last several years, three reservoirs totaling more than 30,000 acres with over 420 miles of shoreline have been flooded in the Raleigh-Durham-Chapel Hill area. These new lakes lie within an hour's drive of Burlington to the west and Rocky Mount and Fayetteville to the east. There's something to suit almost everyone's tastes — from big, open-water fishing for striped bass hybrids to bank fishing for crappie and catfish. And the best news is that the fishing is hot, and should stay that way for a few years.

The largest of the new lakes is B. Everett Jordan Reservoir, a 13,900-acre impoundment managed by the U.S. Army Corp of Engineers. Jordan lake has about 150 miles of shoreline, and is located west of Raleigh and just south of Durham and Chapel Hill. The controversies surrounding water quality in Jordan Lake have been well publicized, and it's still anyone's guess whether the lake will be exceptionally rich in nutrients while maintaining decent water quality or if it will become choked with algae in hot summers. However, one fact stands. Right now, Jordan Lake offers some of the hottest fishing in the State.

"In many respects, Jordan Lake is like a giant farm pond," said Fred Harris, assistant chief of the Division of Inland Fisheries of the N.C. Wildlife Resources Commission. "The lake is very shallow, especially above the U.S. 64 causeway. It is also very fertile, and this makes it productive for fisheries."

In 1982 the Wildlife Commission stocked Jordan Lake with large numbers of largemouth bass, bluegill and redear



sunfish, channel catfish, and white bass-striped bass hybrids. In addition, white bass, catfish and crappie that were present in New Hope Creek and the Haw River before the reservoir was impounded have established populations.

Fishermen in the Triangle area know Jordan Lake has two things — largemouth bass and crappie. Last spring, anglers brought home enormous catches of large crappie from the lake. Later in the season, if you wanted some fine sport you took an ultralight spinning rod or fly rod and fished the upper portions of Jordan Lake for largemouth bass. You had to release just about every fish caught because lengths averaged only eight to 10 inches, but you could catch bass like there was no tomorrow. The good news today is that the crappie are still there and the bass are growing up.

"The bass that were stocked in 1982 should be anywhere from 12 to 16 inches long this summer," said Harris. "For the next two to three years the bass population will increase in numbers and in average size. Then, it will peak and begin to decline until it stabilizes at a moderate level. No additional stockings of bass are planned for the lake. The bass that lived in New Hope Creek and the Haw River before the reservoir was impounded have had good spawning years since the lake was filled, and the fish that were stocked in 1982 should spawn this year.

"Good fishing for crappie should also continue. The reservoir offers excellent cover for bass and crappie — a lot of standing timber and brush was left and flooded. Anglers also needn't be concerned about some of the large catches of crappie being taken from Jordan Lake because it's almost impossible to over-fish a crappie population in a lake with good cover."

Harris says that one of the reasons for the excellent bass and crappie fishing in Jordan Lake is the food base. Shad populations in New Hope Creek and the Haw River exploded after the impoundment was flooded, and offer game fish an almost unlimited food supply. The average size of the shad is still small, and bass and crappie are taking full advantage of their plentiful larder.

Striped bass-white bass hybrids have also been stocked to take advantage of this forage base. "These hybrids are schooling fish that prefer open water," said Harris. "Hybrids routinely grow to 10 to 15 pounds, offer exciting fishing, and are very popular with anglers. In addition, stockings of bluegill and redear sunfish and channel catfish will take advantage of this rich forage base and will provide additional fisheries — especially for bank fishermen."

To the north of Raleigh and Durham lies Falls-of-the-Neuse reservoir, which is also managed by the Corp of Engineers. Falls lake was formed by the damming of the Neuse River, and the new lake totals 12,490 acres with 230 miles of shoreline. In contrast to Jordan Lake, Falls is narrow and twisting and more closely resembles a large river than a lake. Over 100,000 largemouth bass were stocked in Falls Lake last year, and crappie, bluegill and catfish are also found in its waters.

"Falls Lake is about one year behind Jordan Lake in its fisheries," said Harris. "The bass that were stocked last year will be about 10 to 12 inches long this summer. Of course, there's always the chance of catching a large bass that lived in the Neuse River before it was impounded. Like Jordan Lake, much of Falls Lake is very shallow and we expect it to be very productive."

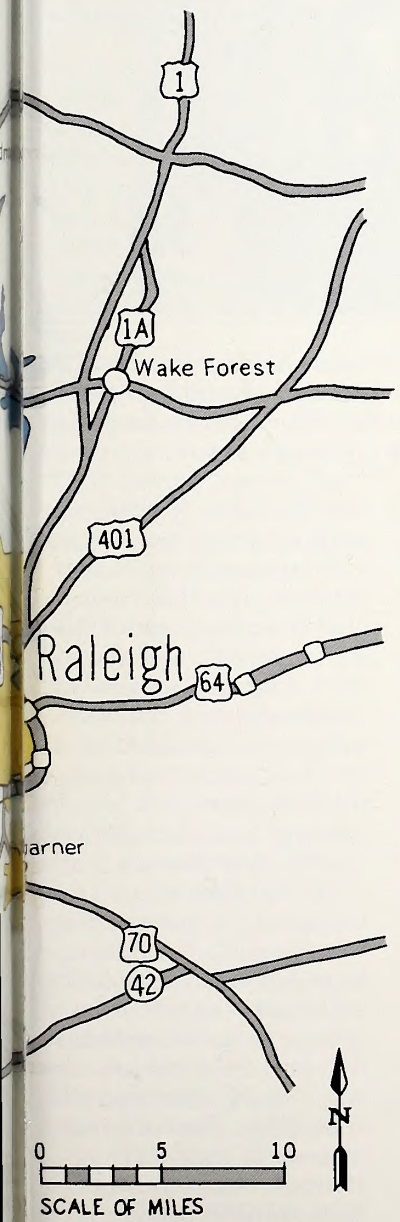
The physical nature of Falls Lake endears it to the small-boat fisherman. The reservoir is narrow and shallow throughout most of its length — the only deep water often lies in the submerged river channel. Numerous creek arms filled with flooded standing timber branch off from the lake. Anglers should travel with care, and the ideal craft for fishing Falls Lake is probably a johnboat with a small motor.

Crappie fishing is good in Falls Lake, especially in the flooded creek arms and in the upper Beaver Dam portion of the reservoir. "We've done some sampling at Beaver Dam, and found crappie weighing a pound or so," said Harris. "There's plenty of cover in the lake, and the crappie fishing should be good in the future. There are also good populations of bluegills and catfish that were present in the river."

There are no plans to stock striped bass-white bass hybrids in Falls Lake, however. "First, we're not sure that the current forage base in Falls Lake would support an additional game fish," said Harris. "However, the chief concern is that hybrids would escape and move down the Neuse River. There is a small, natural run of stripers in the lower Neuse that appears to be making a comeback. We don't want hybrids mixing with this coastal striper run because it would hurt the gene pool of the natural striper population."

The smallest of the new impoundments is Harris Lake, which lies between Raleigh and Sanford east of U.S. 1. This 4,000-acre lake has 40 miles of shoreline, and provides cooling water for the new Shearon Harris nuclear power plant.

"Harris Lake provides excellent fishing for largemouth bass, bluegills and crappie," said Harris. "In addition, the entire watershed surrounding the lake is protected so little silt enters its waters — resulting in a lake that is clear and sparkling blue. The aesthetics alone make Harris Lake a pleasure to fish." ⊠



Maps and Information Sources

B. Everett Jordan Lake — Resource Manager
PO Box 144
Moncure, N.C. 27559

Falls Lake — Resource Manager
PO Box 61068
Neuse Branch
Raleigh, N.C. 27661

Shearon Harris Lake — CP&L
PO Box 327
New Hill, N.C. 27562

Common Sense A Must

Appalachian Trail Still Safe

Written and Edited by Mark Taylor

On May 19, 1982, two hikers on the Appalachian Trail were murdered at a trail shelter outside of Pearisburg, Virginia. The event traumatized the backpacking community. Such things just didn't happen on the Appalachian Trail.

Ultimately, Randall Lee Smith, a 28-year old resident of Giles County, Virginia, was caught and sent to prison for the crimes. However, the murders raised some disturbing questions. Three years earlier, four female hikers had been robbed and raped on the Appalachian Trail in Carter County, Tennessee. Was the trail becoming unsafe?

Happily, the answer is "no." With the blessing of the Appalachian Trail Conference, Warren Cagle, a retired officer with the U.S. Forest Service, conducted a survey of the safety of the trail in 1982. The results of Cagle's report are reassuring. No alarming trends are evident, and criminal incidents on the trail, the Virginia murders notwithstanding, actually declined between 1977 and 1982. "I firmly believe that hiking the Appalachian Trail is one of the safest forms of recreation," Cagle wrote.

Cagle adds, however, that hikers should take steps to protect themselves. "There are two important steps that hikers can follow to protect themselves. The first is not to hike alone, and the second is to 'spruce up' before leaving the trail to hike into town. Women especially should not hike alone, particularly in areas like Carter County, Tennessee, which seems to be the most dangerous part of the Appalachian Trail for women. Hikers should also clean up before going to town."

Cagle also feels that trail shelters should be located in remote areas far away from roads. This is becoming increasingly difficult with the expansion of logging roads near trails. If shelters near roads cannot be moved and the roads are not badly needed, he feels the roads should be closed.

Not surprisingly, Cagle found that the biggest problem facing hikers is vandalism to vehicles left at trail heads. These crimes are often not reported, which is a mistake. Hiking clubs and other outdoor organizations should develop relationships with law-enforcement agencies in their area, and hikers should report vandalism and any threatening incidents to local enforcement authorities.

Finally, Cagle warns against carrying firearms for personal protection. Along with the conflicting maze of regulations governing firearms (carrying an unregistered handgun in Massachusetts can earn you a year in prison without parole), instant access to the handgun is essential if it is to be effective. This can be difficult and dangerous with hiking gear.

"The best protection for hikers anywhere is to follow a few common-sense safety rules — such as not hiking alone, and being alert to possible dangers," he concludes.

— Tom Dillon
Winston-Salem

Off Oregon Inlet

Record Mako Shark Caught

One Big Fish: *Russell Langford of Vienna, Virginia, poses beside the 768-pound new state record mako shark which he caught off Oregon Inlet. Mako sharks are not only excellent fighters, but are also good to eat and strongly resemble swordfish in flavor and texture.*

Most anglers dream of catching a record fish. But, the fates were kind recently to Russell Langford, a 22-year old student from Vienna, Virginia, when he caught a state record mako shark in North Carolina — a 768-pound fish that shattered the old Tar Heel record of 511 pounds.

Russell and his family were fishing off Oregon Inlet with Captain Tony Tillet aboard the *Carolinian*. The family had done quite well in two days of fishing, having caught about 1,200 pounds of tuna and dolphin, and had also caught and released an 8-foot hammerhead shark.

"We were about to head back to port on the second day when my son hooked the mako shark," recalled Hal Langford, Russell's father. "Russell was using 125-pound test gear, and was trolling with a good-sized mackerel. The shark jumped clear of the water three times, and was brought to the boat three or four times before Bull Tolson, the mate, could get a gaff into it. After the fish died, it took all eight of us to pull the shark aboard — it later measured 11-1/2 feet. It was a magnificent creature."

The mako shark is considered the most sporting fighter of all sharks, and is known for its aerial acrobatics and speeds of up to 60 miles per hour. It is also excellent table fare, and in the past, mako "steaks" were often sold as swordfish. The world record mako shark, caught off Montauk, New York, in 1979, weighed 1,080 pounds.

Roanoke River Caper Costly

Violators Caught Shooting Swimming Deer

Poaching can cost you dearly. Two men found guilty of illegally killing a deer in the Roanoke River recently learned this costly lesson when the courts confiscated equipment and levied fines totaling thousands of dollars.

The incident occurred early last December. James Duke of Whitakers, a wildlife enforcement officer with the N.C. Wildlife Resources Commission, was investigating reports of illegal deer hunting from motorboats on the Roanoke River, and had staked out an area on the river's bank in Halifax County. In North Carolina, it is illegal to shoot a deer from a motorboat, and is also illegal to shoot a swimming deer or a deer that is in water above its knees.

"I was hidden behind a tree on the river bank when a river boat appeared from downstream," said Duke. "There were two men in the boat, and they tied up on the opposite river bank from where I was hidden. After about 20 minutes, I suddenly spied a small doe deer swimming the river. The men also saw the deer, and one of them maneuvered the boat towards the deer while the other took a position in the bow with a shotgun. When the boat was right behind the deer, and the animal was still a good 20 feet from the river bank, the man in the bow shot the deer in the head and neck. Then, they pulled the dead deer into the boat — it couldn't have weighed more than 50 pounds. After they had loaded the deer, they headed back upstream towards the US 258 bridge at a fast rate of speed."

Duke radioed the information to Wildlife Enforcement Officer Mike Fulkerson of Scotland Neck, who was working upstream. Fulkerson headed for the U.S. 258 bridge boating access area while Duke remained at the river so the men couldn't slip back downstream undetected. Soon, Duke received word that Fulkerson was holding the men at the access area. He joined Fulkerson, and the officers charged the men with several violations and seized the equipment used in the violations as evidence pending trial.

Subsequently, both men were tried in Northampton County Court by Judge Nick Long. Each man was charged with taking deer with the aid of a motor-propelled vessel and knowingly being in possession of an unlawfully taken deer. The man who handled the boat was also charged with transporting an unlawfully taken deer, and the man who shot the deer was charged with failing to tag a big-game animal at the scene of the kill. The men were found guilty of all charges and each man was fined $500, ordered to pay court costs of $35, and had their hunting privileges in North Carolina revoked for three years.

All of the equipment used in the violations was also confiscated by the court. This included two Browning automatic shotguns in beautiful condition, a .35 caliber Marlin lever-action rifle in very good condition, assorted ammunition, a 1975 15-foot Carolina boat in good condition, a 1975 135-horsepower Evinrude outboard motor in perfect condition, a Long boat trailer in good condition, and one pair of binoculars. A conservative estimate of the value of the confiscated equipment is $4,000.

"We are very pleased with the results of the case," said Gene Abernethy of the Division of Enforcement for the N.C. Wildlife Resources Commission. "Traditionally, we've had problems with this sort of poaching on the Roanoke River. These penalties will certainly act as a deterrent to these wildlife violations."

Local wildlife enforcement officers were also pleased with the outcome of the case. "News of this case traveled really fast in the Roanoke River area, and the heavy fines and confiscation of equipment are making people think twice about poaching on the river," said Duke. "In fact, one illegal river hunter called to tell me there was no way I was going to catch him and take his river boat. After he heard about the outcome of this trial he parked the boat in his backyard and said that was where it was going to stay."

Wild Turkeys Get A Boost

Tar Heel wild turkeys recently received help when the North Carolina Chapter of the National Wild Turkey Federation donated $1,450 to the N.C. Wildlife Resources Commission's wild turkey program. With this contribution, the Federation has contributed over $4,000 to wild turkey management in the state.

"We deeply appreciate this contribution from the North Carolina Chapter of the National Wild Turkey Federation," said Brian Hyder, leader of the Commission's wild turkey project. "The state and local chapters of the wild turkey federation have provided strong support for wildlife conservation in our state."

"We're very pleased to have this opportunity to help in wild turkey conservation efforts, and plan to do more in the future," added Charles Peterson, president of the North Carolina Chapter of the National Wild Turkey Federation.

Anglers Bless The Tie That Binds

What part of your fishing tackle is the most crucial to your success? Rod, reel or lure? Actually, one of the keys to bringing home more fish lies at the end of your line in the knot. How well a knot is tied may have more to do with its strength than the type of knot used. Here are some tips on tying knots.

— Make sure that the line at the knot is not nicked or abraded. The slightest nick in the line reduces strength considerably. It's a good idea to change line frequently — before you notice any loss of strength.

— See that the coils of a knot are formed smoothly. It helps to lubricate the knot with saliva before drawing it up, and slowly draw the knot as tight as possible.

— Clip the tag end of the knot carefully. Avoid clipping too close to the knot — it's easy to nick the line inadvertently.

— Never use heat to "seal" a knot. Application of heat to monofiliment line reduces strength considerably.

From The Heart Of Chinatown

Flounder With A San Francisco Touch

San Francisco rightly boasts of offering some of the finest and most varied cuisine in the United States, and this claim is rivaled seriously only by New Orleans. The swirling fogs that rise from San Francisco Bay add a mystique that is missing in most American cities, and in the heart of "Frisco" lies Chinatown, renowned for its exotic flavor and fine Oriental restaurants. Many of these restaurants specialize in seafood, and the following recipe heralds from the kitchen of a well-respected eatery on Grant Avenue. This recipe features sanddabs, which are the smallest members of the sole family.

We don't have sanddabs here in North Carolina, and swirling fogs are in short supply in much of the State, but we do have plenty of flounder which are kissing cousins to sanddabs. This recipe is equally delicious when flounder are substituted for sanddabs, and I suspect that the dish would work just as well with most fish from fresh or salt water.

3 pounds flounder or other fish fillets
1 tablespoon of peeled, grated ginger root
2 teaspoons salt
4 whole green onions
1 quart boiling water
1/3 cup salad oil, heated
1/3 cup soy sauce
green onions

Dry the fillets, and arrange them on a heat-proof platter. Sprinkle the fillets with salt and ginger and place whole green onions on top of them. Place the platter on a trivet or rack inside a steamer or large roaster containing boiling water for five to 10 minutes, or until the fish flakes easily when tested with a fork. Remove fish from the steamer, and discard the cooked onions and drain any water from the platter. Combine the salad oil and soy sauce and pour over the fish. Garnish with green onions, and serve with rice. Serves six. Enjoy!

— *Curtis Wooten*

Barrier Offers New Life For A Trout Stream

Trout fishing in Boone Fork Creek in Caldwell County recently received a boost from members of the Northwest and Tablerock chapters of Trout Unlimited. These clubs, whose members are trout fishermen in the Morganton, Hickory, and Lenoir areas, recently helped build a fish barrier on the creek in cooperation with the N.C. Wildlife Resources Commission and the U.S. Forest Service.

"The purpose of this fish barrier is to prevent nongame fish — including minnows, horny heads and suckers — from moving upstream beyond the barrier," said Bob Brown of Morganton, a fisheries biologist with the N.C. Wildlife Resources Commission. "Boone Fork Creek has the potential to be a very good brown trout stream, but previous stockings of browns have not done well because of the intense competition they received from high populations of nongame fish for food and living space."

Brown adds that the creek will be stocked with fingerling brown trout after nongame fish are removed from waters above the barrier by electrofishing. "When these fingerling brown trout mature in two to three years, we expect they will provide some very good fishing above the barrier. It's also likely that brown trout numbers will increase in the mile-and-a-half of suitable trout habitat that lies below the barrier."

About 25 fishermen were involved in building the fish barrier, which took three days to complete in temperatures that soared into the high nineties. The heavy equipment that was needed to lift the logs in place was provided and operated by Taylor Construction Company of Lenoir.

"All of the fishermen who were involved in this project certainly deserve commendation," said Brown. "Without their hard work and commitment, this barrier could not have been built."

The construction of the fish barrier was funded by a grant from Trout Unlimited's Operation Restore program. This national program provides partial funding and manpower to repair and rehabilitate trout waters that have seriously deteriorated. These projects are undertaken in cooperation with state and federal fish and wildlife agencies.

— *Curtis Wooten*

Curtis Wooten

A Job Well Done: *Members of the Northwest and Tablerock chapters of Trout Unlimited recently built this nongame fish barrier on Boone Fork Creek in Caldwell County. The barrier will prevent nongame fish from moving upstream, and will aid in the restoration of a brown trout fishery in the creek.*

Looking For a Home

Development Brings Black Bears To Town

Do you want to see a wild black bear? You could try visiting the Holly Shelter game land in Pender County or the Great Smoky Mountains National Park in western North Carolina. Both of these areas have good populations of bears. However, your chances of actually seeing one of the bruins might be better in downtown Wilmington or Morganton.

Nine bears have wandered into downtown Wilmington during the past five years. Morganton has had at least three bears in town in as many years. There have even been two reported bear sightings in Raleigh in the past several years.

What is bringing these bears to town? Could it be that we are seeing a dramatic increase in the number of bears in North Carolina? While there are several probable answers to the first question, the answer to the second is a definite "no." Wildlife biologist John Collins, leader of the big-game project for the N.C. Wildlife Resources Commission, says that "our black bear population is fairly stable at around 1,500 to 2,000 animals."

Collins says that sightings of black bears in and near towns are probably caused by the loss of more traditional haunts. As our forests are swallowed by residential developments, highway construction and industrial expansion, any species of wildlife including bears, move on.

North Carolina's bear populations are located primarily in the mountains and in coastal counties. Residential and second-home developments in the mountains are one of the chief causes of the loss of bear habitat. In the Coastal Plain, large agricultural operations have cleared huge expanses of pocosins and other wilderness habitat. "When bears lose their homes, they have to look for another place to live," said Collins. "Often, they will follow forested rivers and streams and end up in town. Also, as the remaining bear habitat becomes overcrowded with bears, young animals move out searching for new home ranges and often wander into settled areas."

Anyone who sights a bear in or near a town or residential area should leave the animal alone, and should also notify the local wildlife enforcement officer, animal-control officer, or call the Wildlife Commission's toll free Wildlife Watch Hotline at 1-800-662-7137.

— Lawrence Musselwhite

H. Langford

Country Come To Town: *This black bear wandered into Morganton in 1980, and had to be tranquilized and moved to less urban surroundings. Elimination of habitat is putting many bears on the move, and these animals often follow wooded creeks or rivers and accidentally wander into residential areas.*

Keep Fido Tick-Free

Ticks are a chronic summer problem for dogs and cats. The usual treatment involves dipping the animal in a chemical insecticide each week. However, if you prefer a more natural approach, try this organic preventative which was passed on to *Wildlife In North Carolina* recently.

The preventative is simply a mixture of brewer's yeast and garlic which is mixed into your pet's food each day. Use two tablespoons of the mix for medium to large dogs, and less for small dogs and cats. Brewer's yeast and garlic mixtures may be purchased at most health-food stores. Cheese-flavored yeast is also available if your pet has highfalutin' tastes.

— Jay Davies

Conservation Summit Slated

If you're looking for an unusual summer vacation, consider attending one of the Conservation Summits sponsored by the National Wildlife Federation. These summits are held at four locations throughout the United States and Canada, and special programs are available for children and teenagers as well as adults. The week-long programs feature sessions on nature photography, ecology, star gazing, mountain music and crafts, solar energy, and opportunities to fish, hike, backpack, and canoe. Special topics vary depending on location, and college credit is offered for summit activities. The location and dates of the summits are as follows:

- — Antigonish, Nova Scotia, from June 24-30;
- — Black Mountain, North Carolina, from June 23-29;
- — Snowbird, Utah, from July 22-28;
- — Silver Bay, New York, from July 29 through August 4.

For more information on these programs write to the National Wildlife Federation, Conservation Summits, 1412 16th St., N.W., Washington, D.C. 20036 or call 703-790-4363.

Hide The ID Number

Guard Your Boat From Theft

Each year, over 12,000 boats are stolen annually; 214 were reported stolen in North Carolina in 1982. A little extra care on the part of boat owners, however, could reduce this rate considerably. Insurance companies say the following precautions can reduce the risk of boat theft.

— Every boat made after 1971 is required to have a hull-identification number permanently affixed to the hull. Be sure to record this number for your records — it is often the only positive identification that enforcement officials can use to determine ownership of a stolen boat. Although manufacturers are required to "permanently affix" this number to the boat, methods of doing this vary widely. It's a good idea to enscribe this number on the hull in a hidden spot which thieves will overlook.

— Note all pertinent data about the boat. This would include year of manufacture, length, beam, color, identifying scratches and dents, and other information. Also, take some pictures of the boat which clearly illustrate these features.

— Outboard engines should be securely locked to boats at all times. If possible, remove your outboard and store it in a safe place when not in use.

— Use a steel chain or cable and lock to tie up your boat. Avoid leaving boats at unattended docks, especially at night. Also, don't leave small boats or canoes unlocked on docks or on the shore.

— When parking a trailered boat, remove a wheel or attach a lock to the trailer hitch. If you store your boat in a garage, keep the garage closed and locked.

— Install an alarm on your boat's ignition, and have a second "hidden" switch installed in case a thief bypasses the first alarm.

— Always remove the key from the ignition of your boat when it is not in use.

Calendar Of Events

May 5
Ocracoke Crab Festival at Ocracoke. Features parade, crab cook-off, crab queen and crab races. For more information contact Sally Newell, Box 10, Ocracoke, N.C. 27910.

May 4-6
12th annual Spring Wildflower Pilgrimage at Asheville. Features guided field trips, nature walks, and bird tours along the Blue Ridge Parkway. For more information contact Dr. James Perry, Biology Department, P.O. Box 8467, University of North Carolina at Asheville, Asheville N.C. 28817.

May 5-6
Mayo River Races. Features canoe and kayak whitewater races. For more information contact Joe Rone, Rt. 3, Box 288, Summerfield, N.C. 27358.

May 10
Moore County Hounds Hunter Trials at Southern Pines. For more information contact Mile Away Farm, P.O. Box 689, Southern Pines, N.C. 28387.

May 11-13
12th annual Hang Gliding Spectacular at Jockey's Ridge State Park in Nags Head. Oldest continuously held hang-gliding competition in the United States features novice and advanced classes. For more information contact Katherine Martin, P.O. Box 340, Nags Head, N.C. 27959.

May 13
Schiele Museum Wild Foods Festival in Gastonia. For more information contact the Schiele Museum of Natural History, Box 953, Gastonia, N.C. 28053.

May 26-27
"Volksmarch" in Asheville. Features six and 12-mile hikes. For more information contact Western Carolina Hiking Club, Mack Taylor, P.O. Box 1383, Asheville, N.C. 28802.

May 26-27
Environmental Awareness Workshop in Bakersville. Designed to acquaint teachers and leaders of youth groups to techniques of introducing young people to nature. For more information contact the Trailridge-Roan Mountain Environmental Adventure Center, Rt. 2, Hughes Gap Road, Bakersville, N.C. 28705.

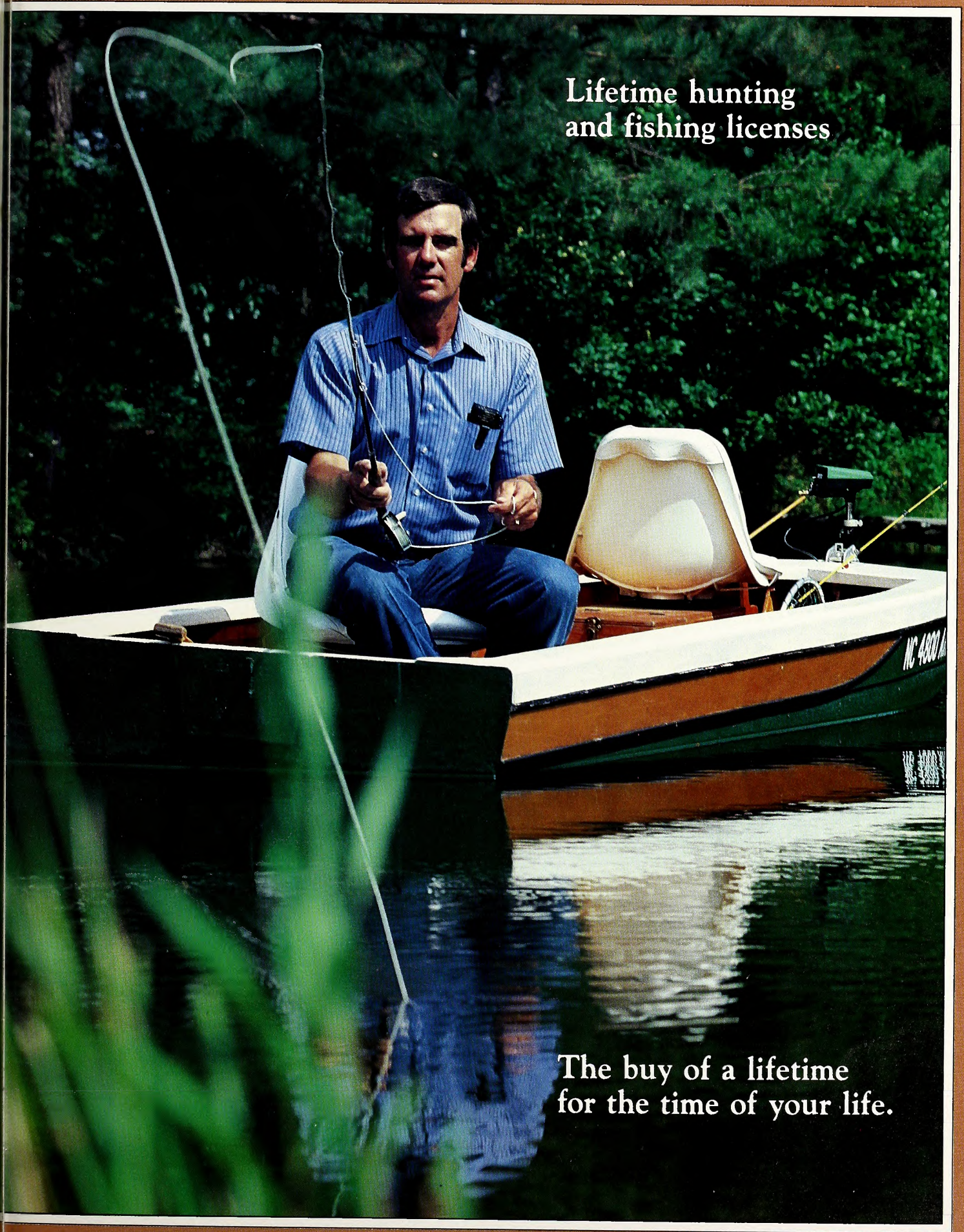
May 26-June 2
Cape Fear Marlin Tournament at Wrightsville Beach. For more information write Cape Fear Marlin Tournament, 4918 Wrightsville Avenue, Wilmington, N.C. 28403.

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on January 31, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	7,311	$2,137,115.21
Lifetime Hunting License	94	15,945.60
Lifetime Fishing License	321	52,924.12
Lifetime Subscriptions to Wildlife In N.C.	242	27,003.93
Contributions		34,183.03
		Fund Total: $2,267,183.03


Lifetime hunting
and fishing licenses
The buy of a lifetime
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Ruby-throated Hummingbird

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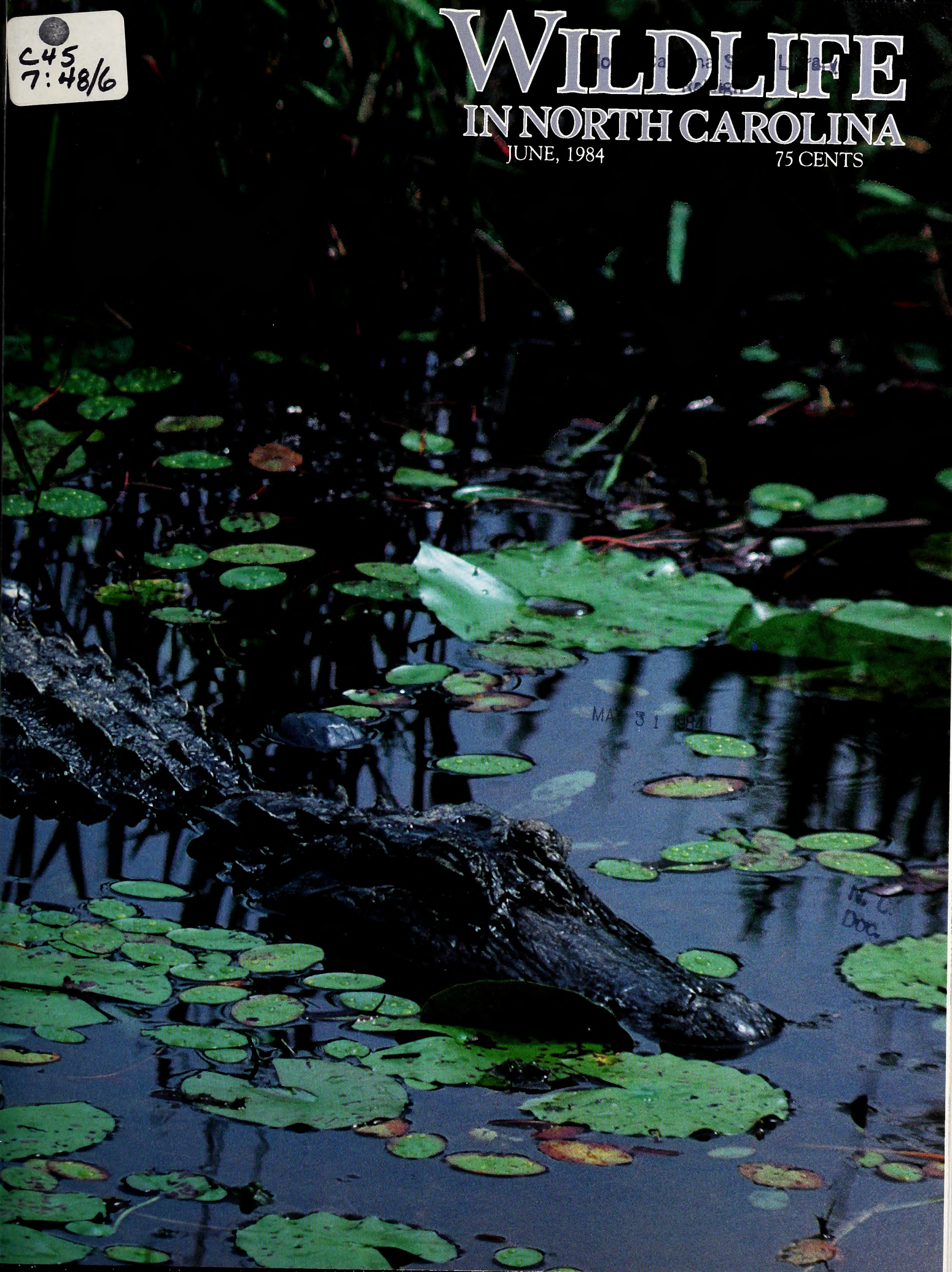

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Otway Burns And The *Snap Dragon*

by Jim Dean

It is highly unlikely that travelers on Rt. 70 passing through Otway in Carteret County know how much significance is attached to the name of that tiny settlement. Nor, for that matter, is it likely that many residents of Burnsville in Yancey County know of the connection between their mountain town and this tiny coastal village.

Both places were named for Otway Burns. Captain Otway Burns was unquestionably North Carolina's most daring sea captain, yet he is almost forgotten today. For two and a half years during the War of 1812, Burns scoured the Atlantic from south of Greenland to the equator in his ship, *Snap Dragon.* Burns was a privateer commissioned by the federal government to raid British commerce on the high seas, and more than any single influence, privateers turned the tide of the War of 1812. Records show that 253 privateers accounted for over 1,300 British ships captured or destroyed, while the U.S. Navy added another 700. Yet no privateer eclipsed Burns' record, nor was any privateer more feared by the British.

Portrait of Otway Burns was painted shortly after War of 1812. Model of **Snap Dragon** *was made by Lt. Cmdr. J.M. MacCormack for the Hampton Mariners Museum in Beaufort.*

Born in 1775 on Queen's Creek about two miles from Swansboro, Burns got his start sailing skiffs in Bogue Sound, and embarked on a career as sailor as a young man. At the time war was declared in 1812, he was in command of a merchant ship enroute to Portland, Maine. In New York, he traded his sluggish ship for a sleek, 89-foot Baltimore clipper named the *Levere,* and had her armed with five carriage guns, including a 12-pound pivot gun. Burns rechristened her *Snap Dragon,* and sailed her to his home in Beaufort.

It was soon obvious that the lightly armed *Snap Dragon* under the helm of Otway Burns was to be a potent force. During the first seven months of its initial cruise, the *Snap Dragon* captured two barks, five brigs and three schooners with cargoes worth more than $1 million, and that was only the beginning. The swiftness of Burns' small ship proved to be invaluable not only in combat, but also when a quick escape was in order. At one point, surrounded by five British men of war, he engaged them in a running battle and escaped. Burns remarked that the *Snap Dragon* could "walk the waters like a thing of life."

Frequently, the *Snap Dragon* was out-gunned, but Burns' superior seamanship and his vessel's swiftness proved more than a match for the larger British ships. In an encounter with the 14-gun *Adonis,* the log entry colorfully noted that the *Snap Dragon* sailed around the hapless *Adonis* and pounded the British ship "like a cooper hammering a cask."

As enemy ships were captured, Burns would install his own skeleton crew and send the prize home, although in some cases, it proved necessary to burn the captured ship. Though Burns treated prisoners kindly, his *Snap Dragon* was widely feared, and its reputation grew quickly.

In one particularly fierce battle, the *Snap Dragon* whipped a 22-gun war-ship only to lose the prize through misfortune. Burns, writing in his journal, noted that while attempting to board a large British ship, the ships collided and the *Snap Dragon* lost its bowsprit and foremast. "They beat off our boarders with pistols, cutlasses, boarding spikes, hand spikes and cold shot. When some were swarming on board, they threw stinkpots, bricks and glass bottles. We do not know her loss (the British ship's), but suppose she lost considerably, as blood ran out of her lee scuppers . . . had the mast stood, she was our prize."

After several successful voyages, Burns was laid up with rheumatism, and the *Snap Dragon* made its last cruise under the command of Lt. Benjamin DeCokely. Without Burns' guidance, the *Snap Dragon* quickly ran afoul of a disguised British man-of-war, the *Leopard.* Heavily outgunned, the *Snap Dragon* was captured and sent to Halifax, England in late June, 1814.

After the war, Burns remained in Beaufort and built several successful merchant sailing ships. He also built the *Prometheus* in 1818, one of the first three steamboats put into service in North Carolina. Burns was highly popular during this period, and served 12 years (from 1821 to 1834) in the General Assembly. Yet, despite wealth accumulated as a privateer, he suffered financial setbacks following his years in the legislature.

In 1835, when Burns was 60, President Andrew Jackson appointed him keeper of the Brant Island Shoal Light off Portsmouth Island, and Burns moved to Portsmouth with his third wife and lived out his days until his death in 1850. He was buried in Beaufort, and a cannon from the *Snap Dragon* rests on a monument at his grave.

In a way, it seems rather odd that Burns is not better known today. Most every school kid knows the story of Captain John Paul, the famous Frenchman befriended by Willie Jones of Halifax, N.C. They know that John Paul adopted the name Jones and went on to glory as skipper of the *Bonhomme Richard.* They know of Jones' famous statement, "We have not yet begun to fight."

Yet, Burns lies in Beaufort, largely forgotten. He and his 147-ton *Snap Dragon,* a small ship by any standard, were far more potent forces against the British. Even Captain Jones might have agreed, but all but one of the *Snap Dragon's* logs have been lost. And lost with them, perhaps, is Otway Burns' best chance at national recognition.

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Cover *This alligator, like most of his kin, will spend much of its time basking quietly in the shallows. Gators, especially big ones, prefer to feed at night. Photograph by Jack Dermid.*

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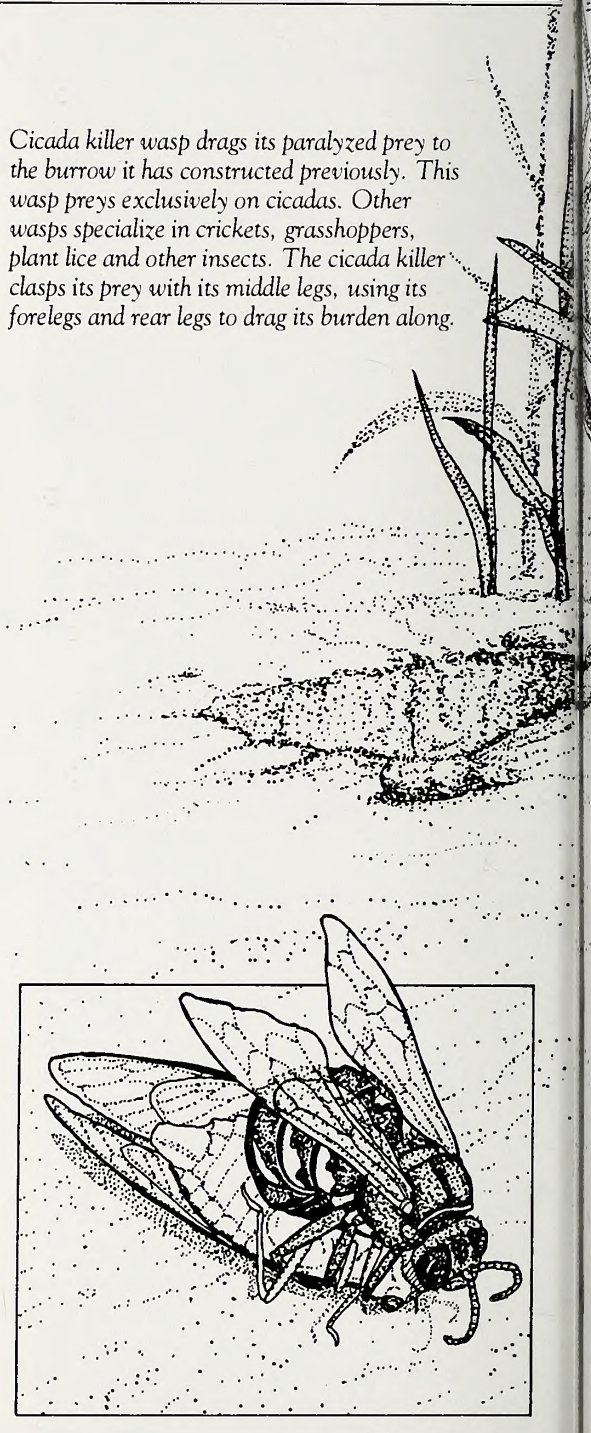
The Cicada Killers

written by Lawrence S. Earley / illustrated by Sue Hall



Cicada killer wasp drags its paralyzed prey to the burrow it has constructed previously. This wasp preys exclusively on cicadas. Other wasps specialize in crickets, grasshoppers, plant lice and other insects. The cicada killer clasps its prey with its middle legs, using its forelegs and rear legs to drag its burden along.

The instincts of some animals are so precise and unerring that you want to part the curtains of the long past to discover how they developed.

Take the example of the female cicada killer *(Sphecius speciosus)*. Here is a wasp that hunts not for any prey, but for one type only, a cicada. It does not kill but paralyzes with a sting that must be delivered with incredible precision. And after all that, she does not eat the cicada but buries it in the ground with one of her unhatched eggs.

Of course, the cicada killer is not the only wasp species to exhibit such behavior, just one of the better known. Wasps are members of the Hymenoptera family, and are related to the bees, ants, sawmills and a number of other insects. Some wasps, called social wasps, raise their young in communal nests, the paper nests that you find hanging from house eves. The solitary wasps, like the cicada killer, raise their young by themselves, and many of them have developed specialized predatory instincts. One species, for example, may prey only on grasshoppers, another on plant lice, while another fills its nest with a smorgasbord of insects.

The cicada killer is found wherever cicadas are present, which means they are found throughout North Carolina. About now it is a cocoon in the ground where it has safely passed the winter. The wasp's internal clock is adjusted so that it wakes up precisely at the season when the cicadas are most abundant. The male is the first to emerge from its underground cell, taking to the air in its brilliant yellow, black and rust colors. A couple of days later the female emerges and mating immediately takes place. From here on it's a life of pleasure for the male — he will live only two weeks, gorging himself on nectar all the while.

To the female falls a different life. She will live twice as long as the male, but it will be a life of labor. Within days of mating she begins to construct her burrow in soft, sandy soil, digging 18 inches deep and pushing out the dirt with her hind legs. At the end of the burrow she will hollow out a small cell.

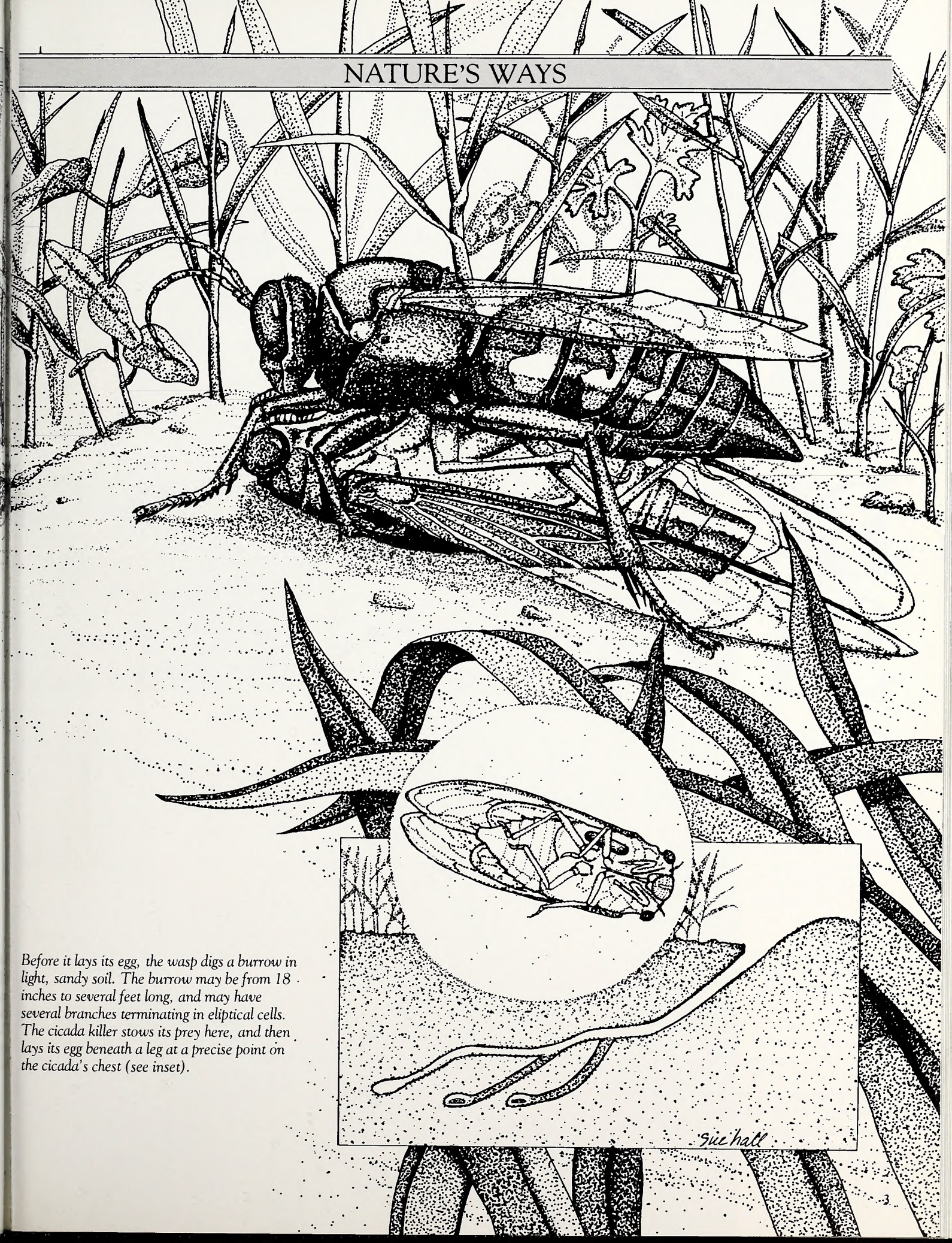
Now she goes a-hunting. Cruising the trunks and branches of trees, she finds her cicada prey. Setting herself upon the hapless creature, she delivers the sting at a specific point on either the right or left foreleg. The spreading poison causes instant paralysis. The wasp turns the cicada onto its back and launches herself into the air, gripping her burden with her middle and rear legs so that it produces streamlining. She lands and drags the cicada — weighing sometimes six times as much as she — to her burrow.

After the wasp pulls the cicada into the hollow cell below, she lays her egg on the chest of the insect and walls the cell shut. Then she repeats the process, digging another cell and hunting another cicada. The paralyzed cicada will stay fresh for weeks. A cell in which two cicadas are placed will produce a female wasp.

In a few days, the egg hatches inside the cell and the larval grub begins to eat the food which its parent had left. Gradually it hollows out the cicada and in about a week the grub is ready for the next stage of its metamorphosis. It constructs a cocoon and there it develops for the next 10 months, awaiting the cell to awaken the following summer.

You may see the cicada killer sometime this summer, and if you do you will know that it is most likely providing for the young it will never see. ⊠

Cicada killers don't really kill their prey, although the effect is the same. They paralyze the cicadas with a sting that is nearly always delivered to a point at the base of the forelegs. The wasp's venom causes paralysis, not death, and the cicada can be kept fresh long enough for the larval wasp to eat it.



Before it lays its egg, the wasp digs a burrow in light, sandy soil. The burrow may be from 18 inches to several feet long, and may have several branches terminating in eliptical cells. The cicada killer stows its prey here, and then lays its egg beneath a leg at a precise point on the cicada's chest (see inset).

Joel Arrington

Land-locked striped bass roam the waters of many of North Carolina's big, inland lakes. These fish may average close to 10 pounds, and larger ones are often caught. To succeed, it takes persistance, skill and luck. These tactics will help you trim the odds.

BIG LAKE STRIPERS

Gerald Almy

by Ed Jenkins

The rod dipped sharply and the quiet was broken by the squeal of the drag on the big spinning reel. The flashing red marks on the depth finder indicated 65 feet of water so I knew the lure was not hung on the bottom. "Fish on!" I called to my wife, Gail, as I put the engine in neutral and scrambled to the stern and took the rod from the bracket. I could feel the protesting surges of the big fish on the other end of the line. I shoved the outfit into Gail's hands. "Reel," I said, "I'll take on the other lines."

I cranked in the heavy downrigger weight that was holding another fishing line so that it wouldn't sink and snag on the bottom or become entangled with the fish on Gail's line. Then, I readied the landing net and watched all 5-foot, 85 pounds of my wife strain against the striped bass on the other end.

At first it was a toss-up, but as the fish tired, Gail gained line. From the depths of the murky, green water, a fluorescent orange spot danced toward the surface before suddenly breaking free of the water. It was the planer.

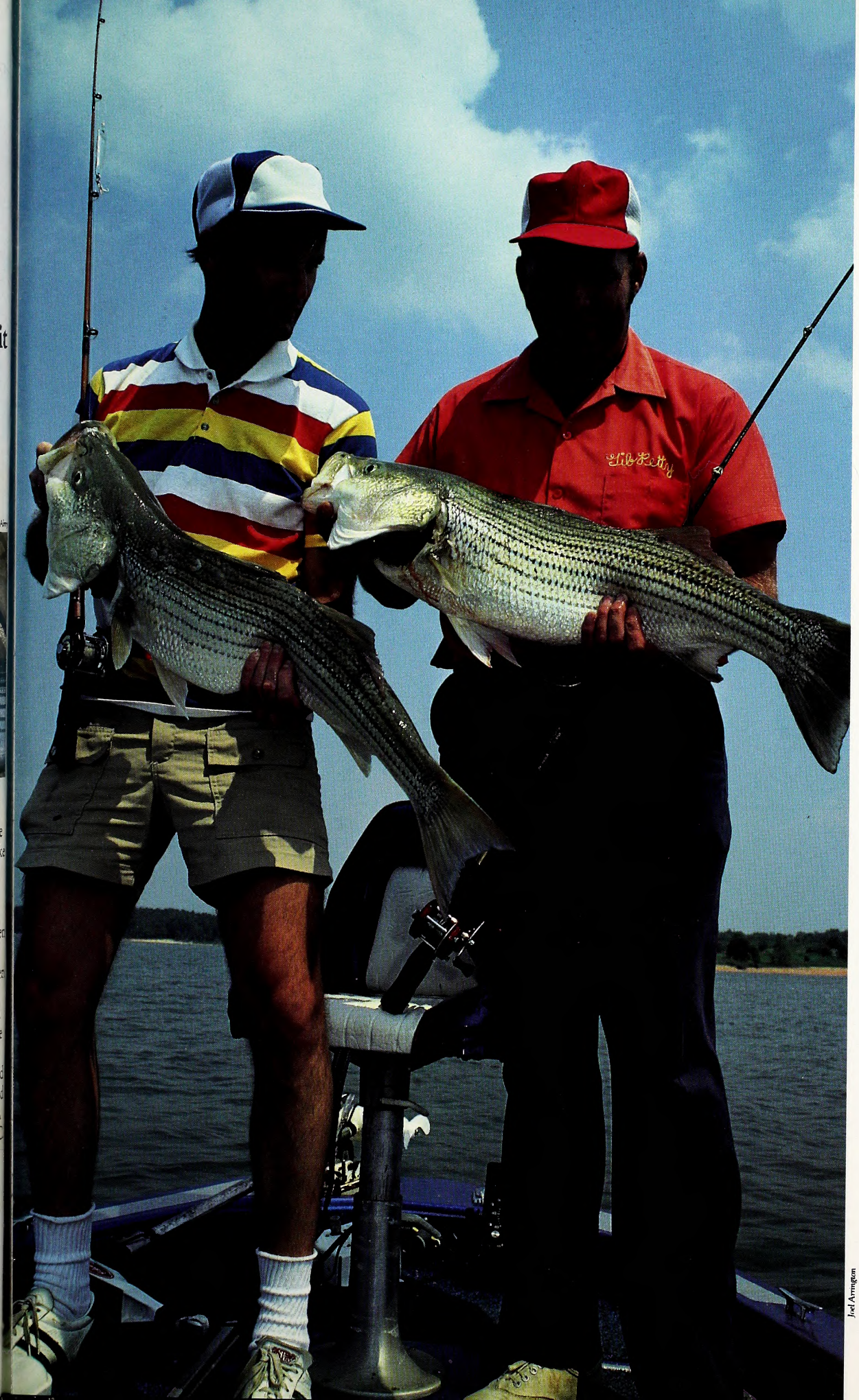
"There he is!" I pointed as I spotted the large moving shadow below the surface. The powerful side-to-side sweeps of the fish's tail sent it out of sight as it spied the hull, and again the fish took line. But the last run was short, and the exhausted striper soon reappeared. I slipped the net into the water, and Gail guided the 12-pounder into the hoop.

As I hoisted the fish aboard and removed the bucktail jig from its mouth, the CB radio blared, "Got one on!" letting us know that a nearby boat had gotten into the same feeding school of fish. Before we could get our lines back into the water, the action was over. The flashing contacts between 25 and 32 feet on the depth finder became fewer then disappeared as the schooling stripers vanished.

The boats that had been bunched together began spreading out trying to make contact with the scattered fish. The scene of searching boats and weaving wake trails reminded me of World War II war movies where American destroyers searched for the German U-boat below. All attention was on the fathometer screen for the telltail "blip" of a contact. There was the intermittent radio chatter between boats trying to figure where the prey had gone. Somewhere below — perhaps even lying on the bottom like silent subs — the quarry had eluded us.

For many, fishing for landlocked striped bass — or rockfish, as they are often called — is a poor man's big game fish outing. A survey of fishermen conducted by the N.C. Wildlife Resources Commission in 1981 indicates that approximately half of the State's anglers fish at least once annually for inland stripers. But many people have no idea of the events that enabled the striped bass to become established as the largest freshwater game fish in our Piedmont reservoirs.

Striped bass are anadromous which



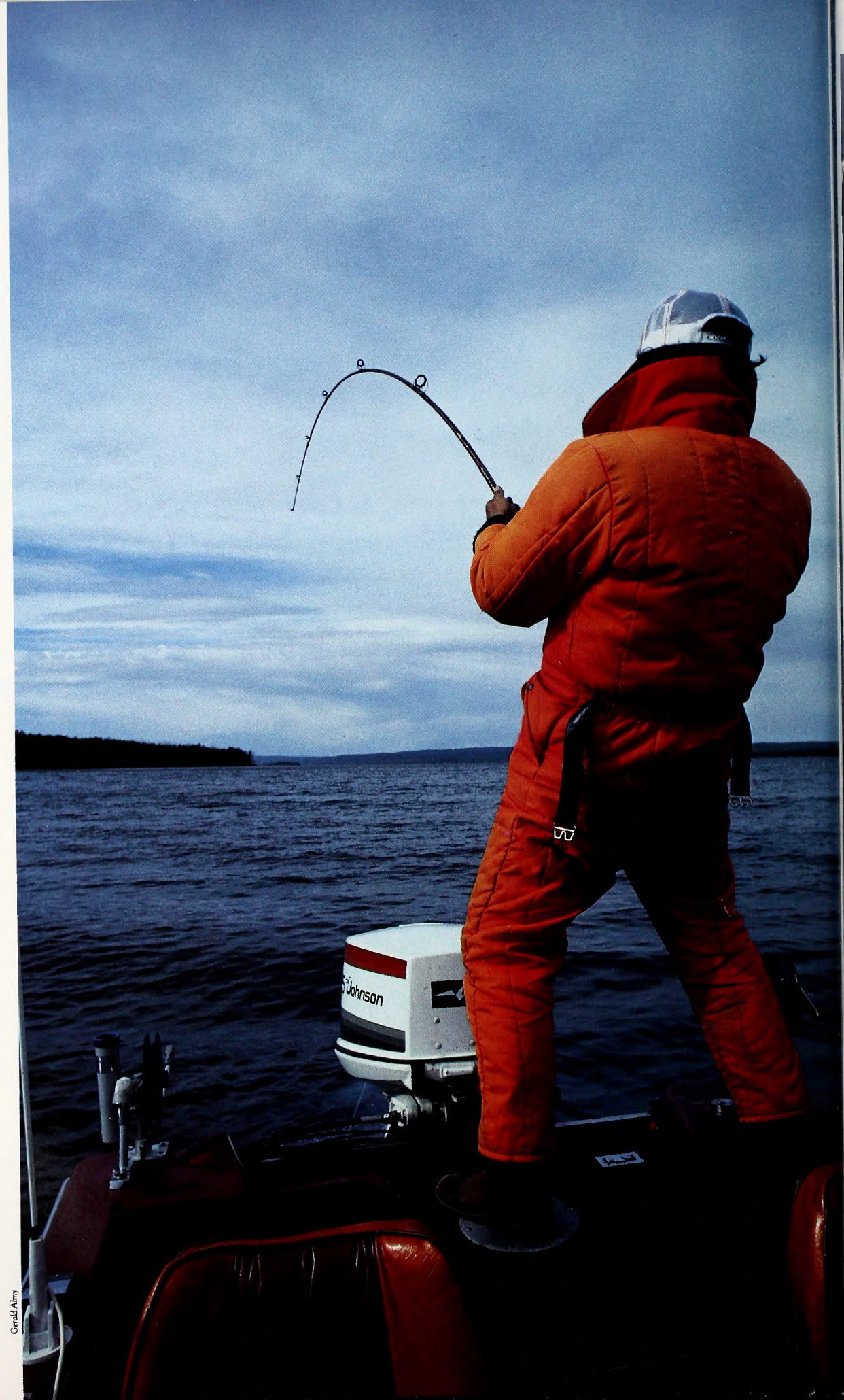
Joel Arrington

Inland Trophies

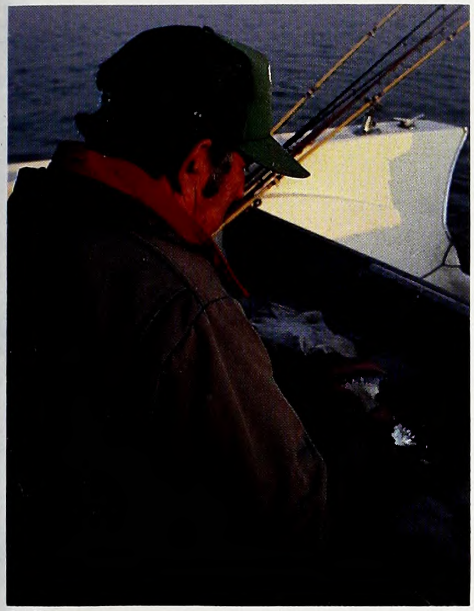
Whether they're caught trolling, deep jigging, casting or live bait fishing, striped bass are among the most challenging trophies available to the big lake angler. In North Carolina, no other major gamefish caught in fresh water reaches such large size, except the muskie which is less abundant and confined to a few rivers and lakes in the western part of the state. Trolling is perhaps the most popular method to fish for stripers, and many anglers use planers or downriggers to fish large plugs trailed by jigs.

Tough Customers

When the fish you catch is likely to weigh from 8- to 12-pounds or more, substantial tackle is a must. Most anglers use casting rods and reels loaded with 15- to 20- pound test line. When a big fish makes its first run, however, you may wonder why you didn't bring a marlin rod. Many fishermen use cut or live shad, though casting to schooling fish on the surface is considered the most exciting fishing. A pair of binoculars is standard equipment on most boats to spot schools feeding on the surface.



Gerald Almy



Gerald Almy

means that like herring, salmon, and shad, they spend most of their adult lives in salt water, but must return to fresh water to spawn. Because fertilized striped bass eggs must remain suspended in the water for a period of 36 to 72 hours before developing into fry, only rivers with long stretches of free-flowing water can serve as spawning areas for the fish. If the eggs reach quiet water before they change to fry, they will sink to the silt bottom and die.

The Roanoke River in northeastern North Carolina has long been recognized as a major spawning river for striped bass. In 1881, S.G. Worth, an early fish scientist, selected a spot on the Roanoke near Weldon to be the site of this country's first striped bass fish hatchery. Worth chose this site because of the large number of spawning rockfish in the area every spring. Many years later, descendants of these annual spawning fish became trapped behind the dam on the Roanoke River when Kerr Lake was impounded in the early 1950s. At first, biologists thought that these fish and other stripers stocked in Kerr Lake might not survive, and certainly wouldn't be able to reproduce without returning to saltwater. But as happened earlier in South Carolina when the Santee-Cooper Reservoir was impounded, the stripers not only survived but also reproduced and thrived in their new environment.

Besides offering fine sport, stripers fill a biological need in many man-made reservoirs. They are an open-water predator in these impoundments and help control the populations of gizzard and threadfin shad which thrive in large lakes. Schooling stripers hunt big expanses of open water much as mackerel and bluefish do at sea and keep the shad in check. This cropping of the shad population stimulates reproduction in the bait fish and makes more food available for other fish.

Every spring, inland stripers instinctively move upstream to spawn. Unfortunately, except in Kerr Lake where the headwaters of the Staunton and Dan rivers are suitable for spawning, most reproduction attempts in our inland lakes are unsuccessful. The striped bass populations in most lakes are maintained through stocking by the North Carolina Wildlife Resources Commission. Over a half-million fingerling stripers are stocked annually in Gaston, Roanoke Rapids, Norman, Mountain Island, High Rock, Tuckertown, Tillery, Badin, and Blewett Falls lakes. Kerr is also stocked to supplement natural reproduction.

Striped bass in our reservoirs have attracted many fishermen the same way our expanding white-tailed deer herds are drawing hunters from the small game ranks. While most fishermen agree that the size of striped bass in our large reservoirs has decreased, fish in the 8- to 12-pound class are common.

There are a number of successful methods to catch big lake stripers, but the time of the year and the cycle the fish are in determines the best method.

After a winter of reduced feeding activity, a new cycle begins as water temperatures warm and stripers begin to gorge themselves on shad before beginning their spring spawning runs. Find shad, and you'll generally find stripers. Floating-diving lures that imitate shad work well this time of year.

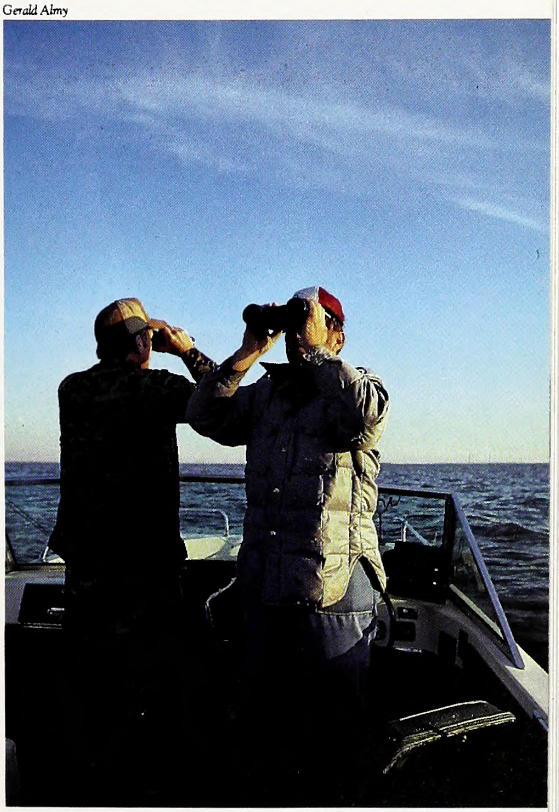
The spring spawning run in April and early May finds fishermen trying to intercept the stripers as they congregate in upstream areas. After they spawn, the fish return to the main lake and spread out. Often they can be found in shallow water coves foraging on shad. Fishing at night off points of land with sharp drop-offs can be productive. Stripers frequently will move into casting distance of shore and can be heard tearing up the water in their feeding frenzies as they attack the baitfish that they have corraled against the shore. During these times they will hit almost any lure thrown into their midst. Bass fishermen occasionally are pleasantly surprised when their spinnerbait or other lure is suddenly attacked by a large striper near the shore.

By early summer, striped bass can still be caught in shallow areas in early morning, evening and night; however, the larger concentrations of fish will be found in deeper water. Many fishermen prefer to fish with cut bait or live shad during this time of year. The larger stripers, perhaps wary of artificial lures, are usually taken with live bait at night. Mike Fulkerson, a wildlife enforcement officer and striper enthusiast on his days off, finds success free-spooling a live shad off deep, rock drop-offs. During the evening Mike lets the baitfish swim near the surface. At night, he adds weight to the line to make the shad swim down to the feeding fish. Often before a strike, the line will start moving erratically as the baitfish tries to escape the jaws of a lurking predator.

Another method used to catch stripers is called jigging. After a school of stripers is located, a lure is lowered to the same depth and raised and dropped to entice a strike. Lead-head jigs and spoons are popular, but the Hopkins Shorty is a favorite of most jiggers. A depth finder is a must for this type of fishing because it locates fish and pinpoints their exact depth.

The line on my casting reel is marked at 10-foot intervals, so by letting out or taking in some line, I can come fairly close to the fish. The 5-foot vertical lift and drop

Gerald Almy



of my rod tip when jigging helps offset any error in judgment. Since most strikes come as the lure is dropping, fishermen maintain a slight tension on the line as the line falls to be able to detect a strike. If the line suddenly goes slack while the rod tip is being lowered, set the hook. Sometimes a fish will take a lure without any feeling of a strike. Unfortunately, although vertical

STRIPERS IN HOT WATER?

Recently biologists have learned that water temperature may limit a lake's population of big stripers.

by Tony Mullis

In recent years, sightings of large dead striped bass have become rather common occurrences on some of our Piedmont North Carolina reservoirs during the hot summer and early fall months. Explanations for the causes of the deaths of these trophy fish have included disease, poor water quality, or old age, but recent studies indicate that the answer may be even more complex. Biologists now suspect that water temperature may be one of the culprits.

At different ages, striped bass prefer different temperatures. Most stripers spawn at water temperatures of about 65 F, and baby striped bass, called larvae, live and grow best at this temperature until they are a few weeks old. When the larvae become juveniles, however, they do better at much higher temperatures from around 75 F to 79 F. After a few months of growth, the juveniles become subadults, and these 8- to 16-inch fish prefer water temperatures of around 72 F. Then, as the subadults become mature adult striped bass, they select even cooler water temperatures of 65 F to 68 F.

A temperature difference of only 4 or 5 degrees does not sound like much to us warm-blooded creatures, but the temperature requirements of adult striped bass are so restricted that most stripers weighing about 10 pounds or more cannot survive water temperatures much above 70 F. If large stripers are forced to stay in warm water for an extended length of time, they will die.

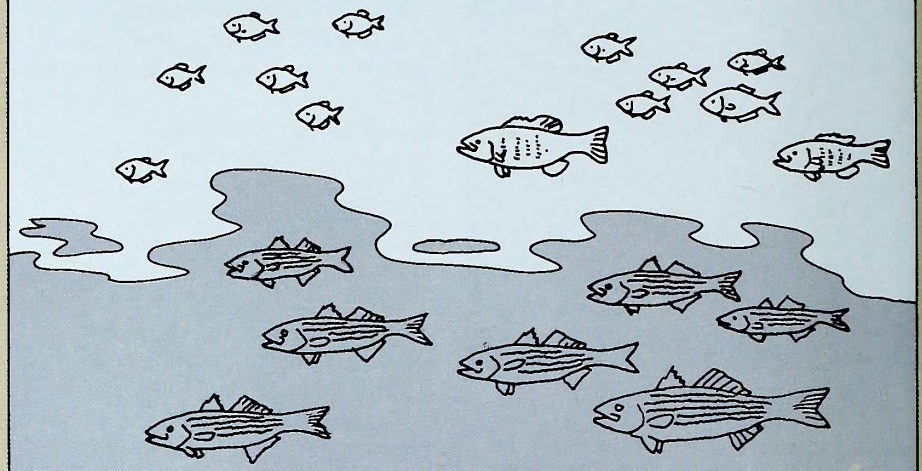
You'd think finding favorable water temperatures in a deep lake would be easy, but that's not always the case. Let's look at what happens to a typical Piedmont North Carolina reservoir during the course of a year. During the late fall, winter, and early spring months, the water temperature is cool, the lake's water is well mixed, and it contains plenty of oxygen from top to bottom. But as the weather warms and the summer air gets hot, muggy, and still, the lake's water begins to form layers, or stratify.

Because warm water is lighter or less dense than cold water, a layer of warm water forms on the surface of the reservoir. Since this top layer is in contact with the air, it has large amounts of oxygen dissolved in it which fish and all other living things must have to survive. Just under the top warm layer of water is a relatively thin layer called the thermocline in which the temperature and the oxygen drop rapidly. A heavy cold layer of water forms on the bottom of the lake which contains very little or no oxygen because it has no contact with the air. The low or non-existent oxygen levels are also caused partially because dead plants and animals sink to this bottom layer, and their decomposition also removes oxygen from the water. These layers of water do not mix in the lake until cool fall weather causes the temperature of the top layer to drop, and the densities of the layers become equal.

How does all this affect striped bass? It depends upon the size of the stripers. While the smaller subadult stripers prefer warmer water and can do well living throughout most of the top layer, the large stripers (over 10 pounds) must stay in cooler water. Therefore, they seek out and remain in the deeper portion of the top layer and in the middle layer where the water is cooler but still contains enough oxygen for them to survive.

However, in many lakes, the water in the top and middle layers is too warm for large stripers, yet the deeper, cooler

Epilimnion—Oxygen content sufficient, but water temperature may be too high for adult stripers. Food supply good.



Thermocline—Most favorable water temperature for adult stripers usually, but oxygen content not always adequate. Food supply often inadequate.

Hypolimnion—Water temperature very cold, and little or no oxygen content. Unsuitable for most fish life.

Adult Stripers And Temperature Stratification

During warmer months, several layers of water often form in large lakes. While there is enough oxygen in the upper two levels to support most fish, because adult stripers have such a strong preference for water at 65- to 68-degrees, they will seek it for comfort even though there may be relatively little water available at that temperature, and limited food there. Indeed, they are reluctant to leave the 65- to 68-degree water even to feed. This dependence upon specific water temperatures may be one of the factors that limit striper populations in some lakes.

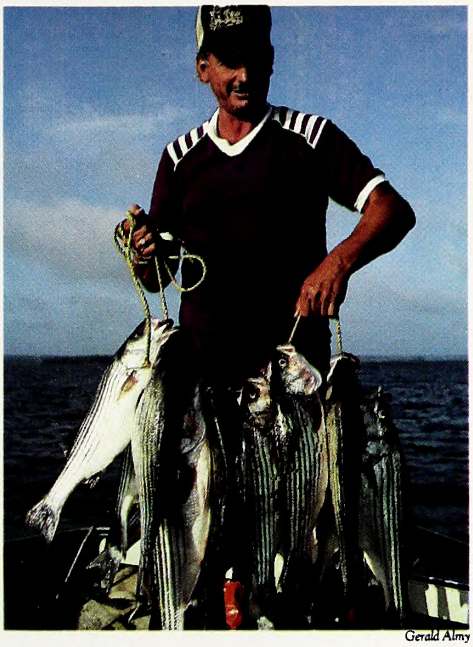
water does not contain enough oxygen for survival. This means that at certain times of the year when the weather is hottest, big stripers almost literally have no place to live — an ironic situation considering the size of many lakes. In these cases, the bigger stripers must find cool pockets of water containing oxygen (thermal refuges) such as those resulting from springs, tailwaters of upstream dams, or other tributary streams entering the lake.

Even if water with suitable temperature and oxygen content is available in the top or middle layers or in thermal refuges, the stripers may still be in trouble. Thermal refuges are usually small in size, so large striper populations in a reservoir may be packed into a relatively small area. Such crowded conditions stress fish and make them more susceptible to disease. Also, the main food fish of striped bass in reservoirs — gizzard and threadfin shad — prefer warmer water temperatures of 84 F to 90 F. So stripers holding in an area of cool water can actually starve to death while schools of food fish swim only yards above them because the stripers cannot tolerate even a short feeding excursion into the warm water!

Fortunately, all of the striped bass in a reservoir population seldom die from these conditions, but they can limit the size of the fish or the success of a fishery.

These same situations occur in reservoirs throughout the southern portion of the United States. To fishery biologists, this information means that the chances of establishing a trophy striped bass fishery in a reservoir with no oxygenated water of less than 72 F are poor. Other trophy fish species with warmer temperature preferences, such as striped bass/white bass hybrids, should perhaps be considered in place of pure strain striped bass.

Anglers should utilize this information as a clue to where to fish for large striped bass during the hot summer and early fall months. Baits and lures should be fished at depths where the temperature is less than 72 F and the oxygen content is good (greater than about 4 parts per million on an oxygen meter). Also, fishermen should look for "thermal refuges" — springs, creek-mouths, reservoir tailwaters, underwater current, and similar conditions — since stripers may be concentrated there. And even though shad and other bait fish may be swimming above and around them, a bait dropped into their temperature and oxygen comfort zone is in danger! ⊠



Gerald Almy

jigging for stripers can be productive when fish are bunched up and hungry, when fish are scattered and have lockjaw, the monotony of jigging can be overwhelming.

During the summer, fishing is usually much better on a weekday than on Saturday or Sunday because boating activity is so high on weekends. Most striper fishing success comes from fishing deep in early morning or at night. While some still use old trolling weights and lead core fishing line, most fishermen are turning to planers and downriggers to get lures down to the 30-foot or deeper range where summer stripers are usually found. Downriggers utilize a cannonball or similar weight on a stainless steel cable to take the fishing line and lure to an exact depth. When a fish strikes the lure, a clip frees the line and the fish from the weight.

A Pink Lady or Drone planer is another good way to troll deep. The lure is tied behind the planer, and when a fish strikes the lure, the planer trips allowing the fisherman to play the fish without the resistance of the planer. The depth to which the planer will dive depends upon its size, the line test, and the length of line to the planer. The best way to control the planer's trolling depth is to control the amount of line from rod to planer.

To determine how much line to let out to reach a certain depth, say 25 feet, try this simple method: first, using a depth finder or lead line, locate a 25-foot depth of water over a smooth bottom. Then troll over this area gradually increasing the amount of line to the planer. When the planer strikes bottom and trips, mark the line at the rod tip or reel. (To avoid losing a lure, use the planer by itself when testing for depth). Repeat this procedure for whatever depths you would like to have marked on your line. It's a good idea to write this information down so that you won't have to go through this step the next time you change fishing lines.

Since Gail and I like to troll with a maximum of lures and a minimum number of fishing rods in our boat, we rig two lures behind each rod. By placing a three-way swivel behind the planer, we troll a white bucktail jig and a small Clark spoon, both with 2-inch white, plastic curly-tails. The line from the swivel to the bucktail is a little over a foot longer than the line to the spoon so that the heavier bucktail will troll lower and behind the other lure. We use a lighter test line from the swivel to the lures than from swivel to the fishing line on the reel. That way if a lure does get hung on a snag, the line to the lure will break before the line to the planer. Better to lose one lure than a planer and two lures.

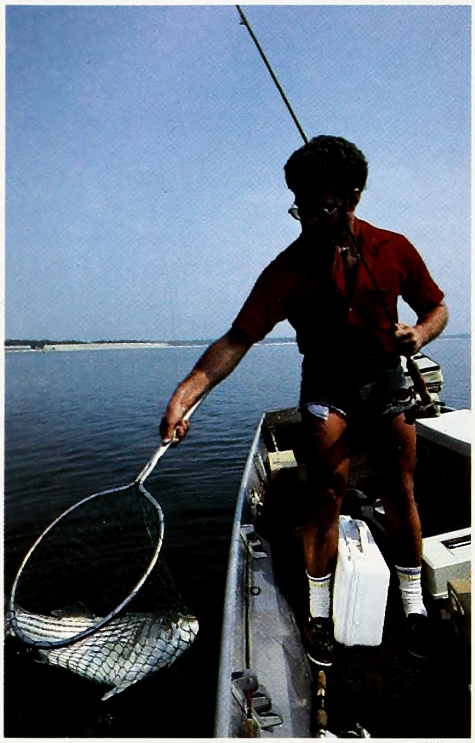
There are fishermen, including Holt Thornton of Raleigh, who troll for stripers using hand lines or a combination of rods and hand lines. Holt ties 100 feet of 130-pound test line to a No. 3 or No. 4 Drone planer then uses 50-pound test line from the planer to the lure. This takes the lure to the 28- to 32-foot depth range which is a good depth for summer stripers. The hand line is attached by a shock cord to a stern cleat on the boat. Holt says that a large silver spoon produced the best results on his hand lines last summer.

As the weather cools in the late fall, stripers again frequently feed on shad near the surface. Fish often can be located

Gerald Almy

School Is In

Stripers are school fish, and the best catches are almost invariably made by well-equipped, knowledgeable anglers who know how to find the classroom. A good depth-finder is essential.



Gerald Almy

A Full Net

The moment of triumph for most striper fishermen comes at the instant a big fish slides into the net — a fitting climax to what can be a long and frustrating quest. By all means, make sure your net is large and the netting strong. A gaff may also be useful if you plan to keep your catch.

by watching for feeding gulls. The object is to get within casting distance of the feeding fish without spooking them. Just about any lure thrown into a feeding school of rockfish will produce results. The tricky part is getting close enough to toss a lure in their midst without sending them to the bottom. It's best to get on the windward side of the school, cut the engine, and drift close enough to make a long cast. An electric motor can be useful in approaching the last 100 yards. If stripers are feeding close to the shore and dive when the boat approaches, Chuck Hayes of Henderson recommends casting behind the boat towards open water instead of trying to cast where they were when they sounded. According to Hayes, when the stripers dive they will swim under the boat towards open water, and occasionally a fish or two may be caught as they head for deeper water.

Many people feel that striped bass fishing in our reservoirs peaks in December. During colder weather some fishermen have luck trolling large, big-lipped lures such as Cisco Kids, Rebels, and Rapalas. These lures usually will troll between 13- to 20-feet deep and are good choices through March. In some cooling lakes for power plants, winter fishing is best in the "hot hole" discharges where the shad concentrate.

When water temperatures become very cold, conserving energy is of prime importance to fish. A striper will expend only a small amount of energy to pursue food which means the fisherman must place the lure almost on the fish's nose to get a strike. In general, fish slow and deep in winter. Stripers seldom will be found in shallow water, but don't overlook deeper holes in coves and creeks.

One method we used a number of years ago in the Chesapeake Bay area to catch stripers that were lying in these deeper holes was to make slow circles over these areas while trolling using heavy, round lead weights. The weights would bump the bottom without snagging and would put the bait where the fish were holed up.

One word of caution — only the heartiest who can brave long hours in freezing temperatures can endure the rigors of fishing in a boat during winter. Fishing can be good, but it also can be dangerous. Any accident or problem encountered is going to be intensified by the cold. A fall overboard, which in the summer may even feel good, becomes a life and death situation in the winter.

Striped bass are delicious table fish and keep well in the freezer. My wife's favorite way to eat rockfish is when it is baked or stewed "down east style" in gravy with potatoes and onions. I prefer them seasoned, covered with slices of onion and bacon, wrapped in aluminum foil, and cooked on the grill. Another way we enjoy them is to fillet the fish (removing the thin strip of red lateral line from each fillet) and cut the fillets into finger-size pieces which are seasoned with garlic salt and pepper, rolled in seafood breader, then fried in hot, deep fat. These tasty morsels when dipped in cocktail sauce remind us of fried shrimp.

Unfortunately, the demand for striped bass as a food source fuels an illegal market for inland stripers. Striped bass on the coast are considered to be commercial fish and can be sold. Inland landlocked stripers are a game fish and cannot be sold. The relatively small populations in our lakes cannot sustain commercial fishing pressure. Yet, though it's illegal, there are people catching and selling stripers to the detriment of the resource. The striped bass populations at Kerr, Gaston, and Roanoke Rapids lakes are lower than in the past. Part of the reason for the decline is increased interest in striper fishing by the general public, but Wildlife Enforcement Officer Jim Ward who patrols those three northeastern lakes feels illegal overharvest of the fish may be the biggest factor.

In an effort to reduce the pressure on striped bass in Kerr, Gaston, and Roanoke Rapids lakes, both North Carolina and Virginia have reduced the daily limit and increased the minimum size for striped bass taken from the lakes. While enforcement of the law prohibiting the sale of inland striped bass is made more difficult because wildlife officers must determine where the fish came from, efforts to try to put an end to the commercialization of the inland game fish have been stepped up. Those convicted have found little sympathy from either the courts or the Internal Revenue Service over unreported income from the sale of fish.

Of course, recreational fisherman know how important striped bass are to their enjoyment, but inland stripers are equally important to local and State economies. The sale of fishing boats and equipment, gas and oil, supplies, groceries, services, rental fees, and increased property values are all parts of our economy.

If we are going to continue to enjoy the benefits of having striped bass in our inland lakes, we must conserve the fish and that means obeying fishing limits and regulations and refusing to accept the actions of those who don't. We owe it to the fish, and we also owe it to ourselves. ⊠

Got a game shortage on your farm? These Wildlife Commission biologists can provide on-the-spot analysis and guidance.

Nine Good Men

by Lawrence S. Earley

The week before the Greater Greensboro Open was to commence this past April, the greenskeeper was frantic. It wasn't only the thought of all those thousands of feet tromping over his well-groomed fairways. It was the other two-legged creatures — 60 of them — that had taken up residence there and so had far refused to leave.

Larry Warlick laughs when he remembers the golf-loving Canada geese. Warlick is the Wildlife Commission's district biologist in District 5. "The fellow called me up and wanted some help," he recalls. "I went over there with Don Harke, the U.S. Fish and Wildlife representative from Raleigh, and we tried to figure out how to get rid of the geese. But when you've got lush habitat like that sitting out there, it's kind of like a kid opening the door to the refrigerator and it's full of ice cream!"

Warlick suggested that whistle bombs and other scare devices might solve the problem, and he was right. By the time the tournament began, the fairways were spruced up again and the geese were nowhere to be seen. The greensman's pulse rate was approaching normal.

The case of the Canada geese that loved golf is not untypical of the kinds of problems Warlick is called upon to solve. Warlick is one of nine professionally trained district biologists employed by the Wildlife Resources Commission to provide technical guidance and assistance to landowners who have a variety of wildlife-related problems. Though they are often asked for their advice on controlling problem wildlife, the biologists' primary responsibilities are to encourage "sound wildlife conservation," says George Smith, Assistant Chief of the Wildlife Management Division and the head of the technical-guidance program.

"These biologists are valuable resource people," he says, "encyclopedias of information. Providing technical guidance is a tough task. The district biologist has to work with landowners, sportsmen, teachers, civic leaders, and be responsive to their questions.

"It takes a pretty well-rounded individual to handle the job effectively, someone who's able to work with people."

What kinds of services do these biologists provide? A staggering array, if measured by the calls they get. Warlick says, "It's just as important for me to help the lady who wants to get some songbirds in her back yard as it is to assist the hunt club that wants to properly manage deer on thousands of acres of leased land in Caswell County. I have to satisfy both their needs."

The district biologists work primarily with private landowners, although they will also give assistance to publicly owned lands in their districts as well. The 245,000 private landowners across the state own the bulk of the land, however, and the technical-guidance program aims at promoting wildlife conservation on these lands. These efforts fall into a few major categories.

HABITAT IMPROVEMENT. The key to managing wildlife is maintaining good habitat. More than 80 percent of North Carolina's wildlife is produced on private lands, many of them small farms, and therefore much of the district biologists' effort is directed toward working with landowners to improve cover and food for wildlife. Landowners can request assistance on a variety of matters, ranging from where to plant a few wildlife food strips to working up a formal, long-range plan for maximum improvement of habitat.

Don Hayes, district biologist in District 7, is currently working on a long-range plan for Camp Raven Knob, a boy scout camp in Surry County. Mike Windsor, the camp ranger, says that they have needed a wildlife program at the 3,200-acre camp for a long time. "Overall we'd like to increase the wildlife habitat here, especially to feed our deer herds. We've got a lot of deer here, and they had a bad time this winter. The oaks didn't provide many acorns and the deer were real hungry. No one had been taking care of our woods, and so we had some problems. When I found out about Don Hayes I was surprised because I didn't realize he was that close."

Hayes toured the area with Windsor and is working up a detailed management plan for the camp. "They had a large wooded area," he says, "so I suggested cutting some openings in the woods where shrubs would grow up and provide browse for deer. They had a couple of ponds so I recommended some wood duck houses. Their deer herd is large, so I'm recommending hunting there to manage the herd even though their policy has prohibited hunting."

Windsor is excited about Hayes' plan. "The wildlife potential here is really great. We're hoping to see some grouse here soon. It might take four or five years for the potential to be realized, but we're willing to look at the long-term picture. We want to provide habitat so our scouts will see and learn something about wildlife."

If asked, the district biologist will help prepare a written, long-range plan for a landowner. He will map the property, point out the different habitats the owner has and how he can manage them for wildlife. He'll advise him on where to plant wildlife foods and when, practices that will not interfere with normal farming operations. He'll provide guidance on managing a woodlot — which trees to cut, which ones to leave — often in conjunction with a state forester. He'll mention the use of houses to encourage nesting by wood ducks, squirrels and other species.

More typically, perhaps, biologists are asked for less formal advice, usually from farmers or hunt clubs interested in increasing the game populations on their property. "I used to get calls from hunt clubs who hunt leased land," says Randy Porterfield, a former district biologist. "They wanted to increase the small game populations. I'd look at the farm and tell them where to have brush area, natural cover and food. I'd give them planting materials for this purpose."

Jim Bowman found when he was district biologist for District 8 that many of his calls came from people who lived in the country but didn't have a rural or farm background. "If you're a rural landowner who's not working that land — maybe you work in a factory — but you want some wildlife on your property, we can advise things that you can do. We can tell you about saving mast trees or den trees, protecting streams, problems of sedimentation, this kind of thing."

WILDLIFE DEPREDATION AND DAMAGE. Another common problem

Jack Dermid

Jack Dermid

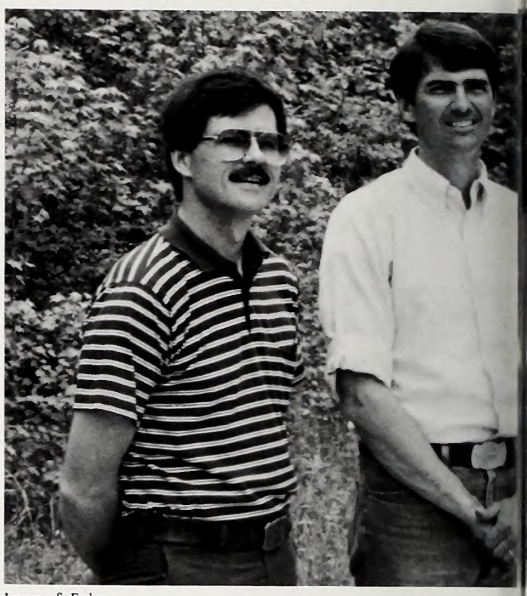
Healthy deer and other wildlife species can be promoted by landowners through habitat improvements on their property — by cutting openings in wooded areas, for example, and planting wildlife foods. District biologists can assist the landowner in improving his wildlife habitat, and can also provide planting materials such as brown-top millet seed (top left). Beaver dams (left) sometimes cause problems, and biologists also offer advice to landowners on controlling problem wildlife.

Leonard Lee Rue, III

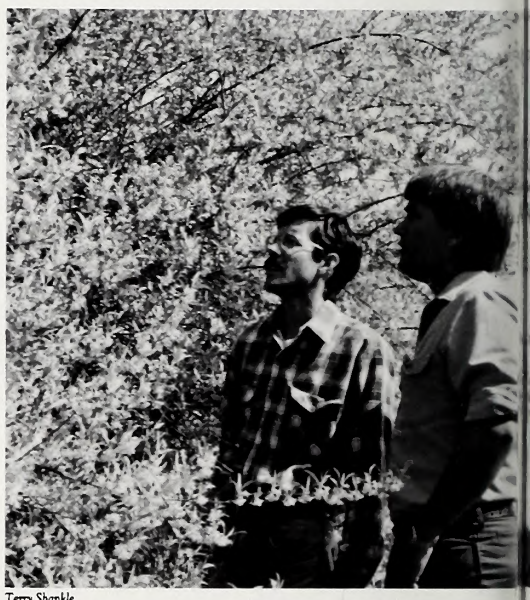
Biologists To The Rescue

In each of the state's nine districts, there is a biologist who can help you. If you want guidance in planting for wildlife, improving wildlife habitat on your land or dealing with problem wildlife, write the biologist in your district.

Name	District	Counties
Rodney D. McClanahan Route 1, Box 442-B Jamesville, NC 27896 Phone No. (919) 792-1659	1	Bertie, Martin, Washington Tyrrell, Dare, Hyde, Chowan Hertford, Gates, Perquimans, Pasquotank, Camden, Currituck
Stephen A. Thomas 2913 Magnolia Drive New Bern, NC 28560 Phone No. (919) 637-5076	2	Greene, Pitt, New Hanover, Beaufort, Carteret, Jones, Pamlico, Craven, Onslow, Lenoir, Pender, Duplin
J. Michael Scruggs Route 1, Box 292-A Rocky Mount, NC 27801 Phone No. 827-5676	3	Northampton, Edgecombe, Nash, Halifax, Warren, Johnston, Franklin, Vance, Wayne, Wake, Wilson
Tommy Hughes Post Office Box 1436 Elizabethtown, NC 28337 Phone No. (919) 862-4216	4	Cumberland, Brunswick, Hoke, Columbus, Scotland, Robeson, Sampson, Bladen, Harnett
Larry Warlick 415 Trindale Road High Point, NC 27263 Phone No. (919) 431-3860	5	Rockingham, Granville, Orange, Caswell, Guilford, Randolph, Person, Alamance, Chatham, Lee, Durham
Terry Sharpe 317 Hamlet Avenue Hamlet, NC 28345 Phone No. (919) 582-3305	6	Mecklenburg, Montgomery, Anson, Davidson, Stanly, Moore, Union, Cabarrus, Rowan, Richmond
Donald A. Hayes Route 1, Box 38-B State Road, NC 28676 Phone No. (919) 874-2682	7	Alleghany, Alexander, Ashe, Forsyth, Watauga, Iredell, Davidson, Wilkes, Surry, Stokes, Yadkin
Jack F. Mason Post Office Box 267 Hudson, NC 28638 Phone No. (704) 396-5363	8	Rutherford, Cleveland, Avery, Caldwell, McDowell, Mitchell, Catawba, Lincoln, Yancey, Gaston, Burke
Joffrey W. Brooks Post Office Box 972 Waynesville, NC 28786 Phone No. (704) 452-0245	9	Transylvania, Henderson, Clay, Buncombe, Madison, Haywood, Cherokee, Jackson, Graham, Swain, Macon, Polk



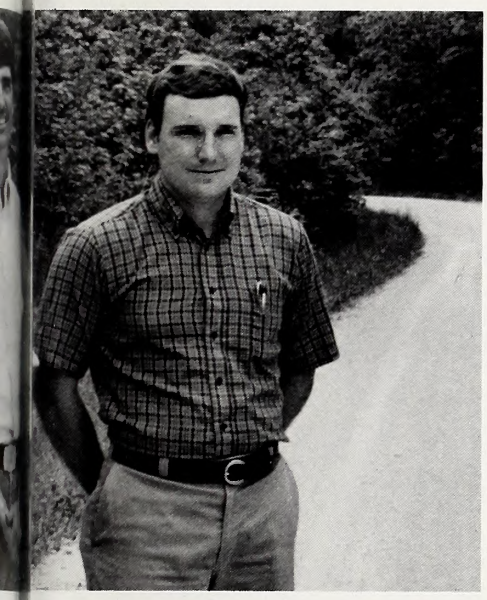
Laurence S. Earley

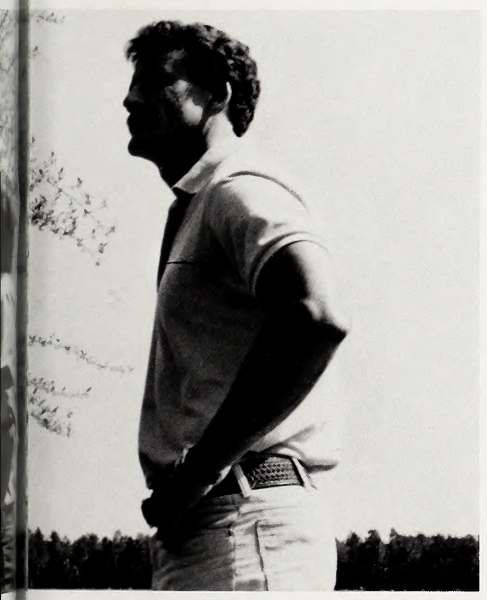


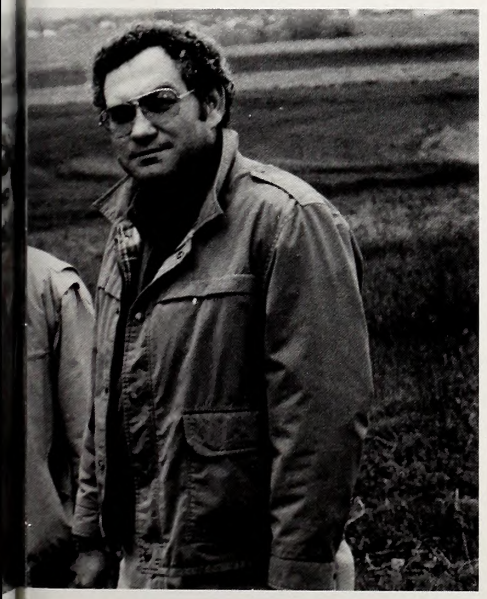
Terry Shankle

Curtis Wooten

Top *Coastal biologists, left to right: Rod McClanahan, Steve Thomas, Tommy Hughes.*
Middle *Piedmont biologists, left to right: Terry Sharpe, Larry Warlick, Mike Scruggs.*
Bottom *Mountain biologists, left to right: Don Hayes, Jack Mason, Joffrey Brooks.*







that biologists are asked to deal with is problem wildlife. Deer and beaver populations have expanded greatly over the past 15 years, and black bears are being crowded out of their traditional sanctuaries. Often property or crop damage is the result. The biologist can look the situation over and advise the farmer or property owner of the laws or regulations that might apply. He can also provide him technical advice on ways of dealing with the animal.

"In the 11 counties I cover, there is a high beaver population in every one," says Larry Warlick. "Some landowners really have a problem. If a man has one of his very best river-bottom fields being flooded or partially flooded, or if he has some high-quality timber being flooded, I can be sympathetic and try to help him out. We can recommend that he utilize that resource during the fur-bearing seasons, or we can issue him a depredation permit. Wildlife enforcement officers usually accompany us in situations like this because we need to know that anything we're advising is legal.

"On the other hand if the flooding is down in a normally wet area, or swampland, and there's nothing in there but a bunch of poorly formed sweet gum and scrub growth, I can point out that the beaver may be providing the landowner a service. That's really fantastic habitat. People can hunt there, It's great for waterfowl, deer, furbearers, and small game."

Rod McClanahan, District Biologist in District 1, says that summer is his heaviest season in dealing with complaints about wildlife depredation. "One fellow from Gates County wrote me," says McClanahan. "He was a sweet potato farmer, and he said the deer were digging up his sweet potatoes. He didn't want to have to go out to the field and shoot deer in summer, so he asked me what he could do. I sent him plans for an electric fence. The fence kept the deer out, sure enough, but the funny thing was they all moved down to his neighbor's field. His neighbor also built a fence and they continued to move to adjoining fields until the last guy said, 'I can't afford to build a fence!'"

Biologists often suggest that the best way of controlling wildlife populations is by hunting them during hunting seasons. "A lot of times we say to landowners, 'Why don't you invite the local hunt club over to harvest some of those depredating deer,'" says Randy Porterfield. "Hunting can actually be beneficial to deer populations because the reduced number of deer will be healthier."

EDUCATION. By talking to school groups, wildlife clubs, sportsman's clubs and agricultural organizations, biologists can get the word out about wildlife conservation. Appearances on local radio and television stations also help.

The biologists also work with small woodlot committees in his district. These interagency committees were established by Governor James B. Hunt Jr. to provide expert advice for the management of privately owned woodland areas across the state. Wildlife biologists, foresters and technicians join hands with representatives of the Soil Conservation Service, the N.C. Forest Service and other state agencies, sometimes sponsoring tours and putting on demonstrations. They also review each other's plans. The SCS agent who is developing a plan for soil and water conservation may refer the landowner to a district biologist to make recommendations on wildlife habitat.

Jack Mason works with representatives from the Soil Conservation Service, the Agricultural Extension Service and other agencies to give programs to schools during the year. In the spring, Conservation Field Days bring him and other agency representative to the fourth, fifth and sixth grades in certain schools. "Each of us tells what we do and what our agency does. I talk a little about wildlife and wildlife habitat. Then I do some hands-on work with, say, teeth and antler development in deer. I'll talk about how to determine how old animals are and why we want such information," says Mason.

George Smith sees the district biologists' educational responsibilities as crucial to their jobs in the field. "One of their main jobs is to effectively communicate the Wildlife Resources Commission's programs, not only the technical guidance programs, but the programs of the Enforcement Division or the Conservation Education Division," he says.

Besides his work in these areas, the district biologist has a host of other responsibilities, including signing up landowners in the RENEW program and participating in wildlife surveys which provide data for developing new hunting and trapping regulations.

The district biologist's job is one of the most important in the Wildlife Resources Commission. He's the point man, the man who solves problems and dispenses advice and counsel with the skill of a diplomat. But best of all, he's there to help.

As Larry Warlick puts it, "Here is someone who's available to you, someone who is trained to come and help you. There are a lot of things he can do." ⊠

Big Game Tag Report Number 8

. . . a summary of North Carolina's big game harvest for 1983-84 as reported by hunters to Wildlife Cooperator Agents

Why should a hunter go out of his way to tag and report the turkey gobbler he just shot? How many deer were harvested during the 1983-84 season here in North Carolina? Was the total deer harvest for this period greater or less than this figure for last season? How is this information used? These are questions that often surface during discussions of North Carolina's big game tagging system. The big game tagging system is a reporting procedure which requires that all wild turkey, boar, bear and deer which are harvested by hunters here in the State be tagged at the site of harvest and that certain information be reported to any one of approximately 1,500 Wildlife Cooperator Agents for later collection by the Wildlife Resources Commission. This procedure became mandatory in the fall of 1976. Successful game management is based on many factors and individual pieces of information, including in this case, big game harvest figures. The more a game manager knows about population trends and numbers, the easier it is for him to make decisions affecting seasons, bag limits and other regulatory matters. Sound big game management must be the result of the combined efforts of sportsmen and the staff of the Wildlife Commission. While the figures in this report represent the reported harvest and may vary from the actual harvest, they are the best such figures available at this time. Please do your share to see that future reports of this nature are as complete as possible by tagging and reporting your big game harvests and by encouraging your fellow sportsmen to do the same.

If you have questions about the procedures or this report, please contact the Division of Wildlife Management, North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Archdale Building, Raleigh, North Carolina 27611.

1983-84 Reported Black Bear Harvest

County	Male	Female	Sex Unk.	Total	Game Land	Other Land	Unk. Land	Rifle	Shotgun	Gun Unk. Or Other
Avery	4	2		6	5	1		6		
Bladen	8	5	2	15		15		12	2	1*
Brunswick	2			2		2		1	1	
Buncombe	4	1	1	6	3	3		5	1	
Burke	6	1	1	8	8			7	1	
Caldwell	4	2		6	3	3		6		
Carteret	7	1	2	10	3	7		10		
Cherokee	9	6		15	15			12	3	
Clay	9	7		16	13	3		14	1	1
Columbus	1		5	6		6		6		
Cumberland	2	1		3		3		2	1	
Craven		1		1	1				1	
Graham	21	7		28	28			27	1	
Haywood	23	11	2	36	31	5		34	1	1
Henderson			1	1		1		1		
Jackson	5	2		7	6	1		5	2	
Jones	9	7		16		15	1	15	1	
Macon	14	5	1	20	19	1		20		
Madison	8	2	2	12	12			8	4	
McDowell	4	5		9	4	4	1	7	1	1*
Mitchell			1	1		1		1		
Onslow	5	3		8	1	7		5	3	
Pamlico	2	4	1	7		7		6		1*
Pender	20	8	3	31	8	20	3	26	4	1**
Rutherford	1			1		1			1	
Swain	2	4		6	4	2		6		
Transylvania	4	3		7	7			6		1
Yancey	13	9		22	9	13		18	4	
Totals	187	97	22	306	180	121	5	266	33	7

*Bow
**Handgun

1983-84 White-Tailed Deer Reported Harvest

County	Sex Harvested				Total Harvest	Antlered Bucks Per Sq. Mile[a]	Weapon[b]				Location[b]	
	Antlered Bucks	Button Bucks	Does	Not Listed			Shotgun	Rifle	Muzzle-Loader	Bow	Game Lands	Other Lands
Alamance	181	10	36		227	0.86	80	114	12	20		227
Alexander	64	5	24	1	94	0.38	7	63	11	12		82
Alleghany	428	23	84	2	537	3.68	1	268	86	182		526
Anson	456	52	165		673	1.25	182	421	29	35	27	639
Ashe	326	47	180		553	1.34	7	312	119	110	10	502
Avery	43	7	16		66	0.21	7	36	2	20	58	8
Beaufort	1,229	95	451	2	1,777	2.33	179	1,541	24	20	32	1,680
Bertie	961	81	476	1	1,519	1.92	1,150	336	9	16	37	1,348
Bladen	1,387	92	521	6	2,006	2.05	1,266	675	11	33	43	1,805
Brunswick	1,130	67	381		1,578	1.68	1,289	241	20	7	15	1,522
Buncombe	199	51	302		552	0.43	4	518	12	16	33	515
Burke	595	64	255	1	915	1.46	51	713	43	105	191	717
Cabarrus	11				11	0.07	8		3			11
Caldwell	244	18	86		348	0.64	23	270	14	39	114	234
Camden	119	6	14		139	0.78	83	54	2			139
Carteret	245	1	29		275	0.66	94	163	5	5	80	182
Caswell	785	72	284	1	1,142	2.82	466	493	84	96	184	942
Catawba	55	3	10		68	0.31	4	37	11	16		68
Chatham	499	15	80		594	0.97	121	351	63	54	127	458
Cherokee	9				9	0.02	4	4	1		8	1
Chowan	316	27	123		466	3.47	127	309	13	14		466
Clay	56		3		59	0.32	1	54	1	3	59	
Cleveland	74	1	5		80	0.36	1	63	4	10	2	74
Columbus	1,094	62	365	2	1,523	1.68	1,098	341	24	35		1,523
Craven	1,178	62	396	1	1,637	2.26	325	1,228	33	37	116	1,456
Cumberland	290	25	93	3	411	0.78	108	273	3	25		411
Currituck	148	12	67		227	1.19	81	126	1	19		227
Dare	108	1	3		112	0.39	43	53	6	9	99	8
Davidson	312	30	136		478	1.05	19	328	52	77	39	428
Davie	152	16	45		213	1.28	15	151	26	21	5	192
Duplin	677	15	92	2	786	1.39	274	501	4	1	3	742
Durham	115	15	56		186	0.65	86	70	15	14	64	119
Edgecombe	686	79	288	4	1,057	2.88	482	539	9	15		1,057
Forsyth	15				15	0.08	2	8	3	2		15
Franklin	468	11	72	1	552	1.56	360	171	2	14	33	483
Gaston					0	0.00						
Gates	910	127	385	1	1,423	3.73	1,134	241	19	14	11	1,347
Graham	12				12	0.04		12			11	1
Granville	611	50	169		830	1.79	261	472	50	39	222	564
Greene	31				31	0.26	13	18				31
Guilford	70	3	13		86	0.22	20	52	9	5		86
Halifax	1,217	113	468	2	1,800	2.82	585	1,149	19	24	11	1,661
Harnett	99		1		100	0.30	59	33	3	4		98
Haywood	136	10	57		203	0.32	1	182		20	197	6
Henderson	118	3	27		148	0.48	2	107	13	23	106	41
Hertford	403	39	114		556	1.77	418	127	1	4		556
Hoke	321	38	143	2	504	1.30	88	375	8	25		504
Hyde	484	53	193	1	731	1.26	172	442	47	42	38	685
Iredell	194	4	23		221	0.73	10	135	37	38		221
Jackson	1				1	0.00	1				1	

County	Sex Harvested				Total Harvest	Antlered Bucks Per Sq. Mile[a]	Weapon[b]				Location[b]	
	Antlered Bucks	Button Bucks	Does	Not Listed			Shotgun	Rifle	Muzzle-Loader	Bow	Game Lands	Other Lands
Johnston	168	10	58		236	0.41	88	137	3	8	1	218
Jones	1,141	36	233	2	1,412	3.16	216	1,150	16	19	75	1,205
Lee	43	1	1		45	0.25	10	31	1	3	9	35
Lenoir	227	6	38		271	1.18	32	234		3		239
Lincoln	22	1	3		26	0.15	8	5	9	4		26
Macon	129		4		133	0.30	5	115	7	6	122	11
Madison	39		3		42	0.12		34	2	5	34	8
Martin	509	10	33	1	553	1.73	320	211	3	17		553
McDowell	177	4	49		230	0.50	7	148	8	63	156	72
Mecklenburg	24	2	8		34	0.10	12	1	10	10		34
Mitchell	58	1	3		62	0.34		48	6	8	27	35
Montgomery	971	123	428		1,522	2.49	170	887	226	223	285	1,223
Moore	237	45	136		418	0.44	145	238	2	24	3	412
Nash	193	1	1	1	196	0.68	57	135	1	3		196
New Hanover	67	6	24		97	0.71	63	29	2	1	1	79
Northampton	1,065	125	516	1	1,707	3.25	907	740	18	20	11	1,681
Onslow	1,115	104	470	2	1,691	1.90	1,123	464	29	60	37	1,612
Orange	302	17	65		384	1.29	102	216	36	27	5	351
Pamlico	368	17	69		454	1.59	39	380	13	15	9	442
Pasquotank	54	2	5		61	0.48	43	16		1		61
Pender	1,550	178	868	12	2,608	2.22	1,292	1,190	29	54	60	2,263
Perquimans	127	6	14		147	0.94	47	99				147
Person	385	26	71		482	1.53	216	215	25	24	14	433
Pitt	597	22	121	1	741	1.92	93	616	6	21		741
Polk	64	2	4		70	0.37	3	58	3	6	47	23
Randolph	271	28	99		398	0.55	36	229	40	92	24	369
Richmond	525	34	165		724	1.53	402	290	16	14	56	645
Robeson	220	1	4		225	0.47	156	60	1	7	1	205
Rockingham	283	23	56		362	0.78	64	212	32	51		362
Rowan	182	6	12		200	0.76	19	118	36	27	15	184
Rutherford	175	1	2		178	0.44	10	152	6	9	31	139
Sampson	595	55	223		873	1.06	406	446	5	10		873
Scotland	278	7	21		306	1.43	250	41	1	14	100	193
Stanly	212	15	73		300	1.08	39	164	32	61	19	271
Stokes	91	3	4		98	0.30	3	76	7	12	1	88
Surry	114	11	41		166	0.34	20	97	11	37		166
Swain	4				4	0.01		4				4
Transylvania	148	3	13		164	0.44	5	131	7	20	138	26
Tyrrell	111	1			112	0.33	23	79	7	3		112
Union	29				29	0.10	7	21	1			29
Vance	269	13	27		309	1.74	114	183		10	12	277
Wake	80	2	2		84	0.16	16	61	2	4	20	61
Warren	558	65	288	2	913	1.77	713	179	1	10	26	799
Washington	98	15	40		153	0.52	58	70	3	21	18	128
Watauga	8		2		10	0.04		5	3	2		8
Wayne	38	3	6		47	0.16	18	27	1	1		47
Wilkes	423	39	164	1	627	0.72	11	410	63	140	63	555
Wilson	9				9	0.06	4	5				9
Yadkin	92	3	4		99	0.54	6	73	14	6	2	90
Yancey	156	7	40		203	0.64	4	130	20	47	118	85
State Total	33,863	2,585	11,242	56	47,746	1.08	18,194	24,835	1,727	2,543	3,516	42,359

[a]Square miles of forest as index of deer habitat.

[b]Totals may not equal Total Harvest values because Cooperator Agents failed to list on some Big Game Harvest Records.

1983-84 Reported Wild Boar Harvest

County	Male	Female	Sex Unk.	Total	Game Land	Other Land	Unk. Land	Rifle	Shotgun	Gun Unk. Or Other
Burke	6	5		11	1	8	2	8		3
Caldwell	4	4		8		7	1	3	5	
Cherokee	2			2	2			1	1	
Graham	31	36	7	74	70	2	2	62	6	6
Macon		1	2	3	3			3		
Swain	1			1	1			1		
Watauga	1	1		2		2				2
Totals	45	47	9	101	77	19	5	78	12	11

1983 Reported Wild Turkey Harvest

County	Turkeys Reported	Game Land	Other Lands	Weapon Used			
				Shotgun	Rifle	Bow	Muzzle Loader
Alamance	9		9	9			
Alleghany	16		16	13	3		
Ashe	18		18	18			
Bertie	14		14	14			
Burke	2	2		1	1		
Caswell	102	17	85	102			
Chatham	16	2	14	16			
Cherokee	19	18	1	19			
Clay	1	1		1			
Craven	1		1	1			
Durham	1		1	1			
Edgecombe	1		1	1			
Franklin	1		1	1			
Graham	3	2	1	3			
Granville	4		4	3	1		
Guilford	1		1	1			
Halifax	1		1	1			
Haywood	1	1		1			
Henderson	6	6		6			
Jackson	1	1		1			
Jones	1		1		1		
Macon	6	5	1	6			
Madison	1	1		1			
Martin	9		9	9			
McDowell	1	1		1			
Montgomery	8		8	8			
Moore	8	2	6	8			
Northampton	3		3	3			
Onslow	24		24	24			
Orange	14		14	11	3		
Pender	2		2	2			
Person	21		21	21			
Randolph	1	1		1			
Richmond	11		11	11			
Rockingham	2		2	2			
Transylvania	10	10		10			
Union	1		1	1			
Wake	3	2	1	3			
Watauga	1		1	1			
Wilkes	6	6		4	2		
Totals	351	78	273	340	11		

James Crowe

The alligator's natural range extends north to eastern North Carolina, yet despite a modest comeback, their future is still uncertain here.

'CAROLINA GATORS

by Manley Fuller

Mosquitoes buzzed around my head as Alex Flora, Marty and Arnold Rivenbark and I poled our johnboat through the shallows. A hammer-like chorus of tree frogs filled the night air. A startled cormorant squawked in alarm, and laboriously flapped its wings as it struggled into flight. I swept the spotlight across the marsh. Suddenly, a set of eyes appeared in the still waters at the edge of the marsh — two glowing charcoal briquettes half hidden by a large cypress tree. As suddenly as they appeared, the embers vanished.

"He's gone under," Alex said.

We waited in silence. Clouds of midges hovered around the boat, clogging my throat and making my eyes burn. I coughed and wiped my eyes. I scanned the marsh again and the red eyes reappeared, moving steadily across the black water.

"That's a big gator," Arnold said with a smile. "Let's get him."

We weren't poaching alligators on that hot summer night in 1977 deep in the Croatan National Forest. I was a graduate student at N.C. State University, and with the help of volunteer technicians Alex Flora and Marty and Arnold Rivenbark I was conducting a baseline study of alligators in the Croatan National Forest. The project was designed to investigate the population, habitat needs, food habits, movements, and reproductive and growth rates for alligators in this area. This was the first study of alligators in North Carolina, and was sponsored by N.C. State University, the N.C. Wildlife Resources Commission, and the U.S. Fish and Wildlife Service. Other faculty researchers and graduate students at N.C. State University followed with studies of alligator movements, reproduction, home ranges, and distribution throughout coastal North Carolina.

I've been fascinated by alligators, dinosaurs and other cold-blooded critters since childhood. Indeed, the highlight of my seventh birthday — if not my entire young life — was a visit to Ross Allen's Reptile Farm in Florida to see an alligator named "Big George." He was huge — over 14 feet long and seemed as big around as a whiskey barrel — and to this day is still the biggest alligator I've seen. He made a strong impression on me, and this fascination has never faded. In fact, when I was 11 I almost bought some alligators from Ross Allen's Reptile Farm (it was legal then) to release in Lake Hickory. A lack of funding terminated the project, however.

When I studied wildlife as a graduate student at N.C. State University, none of my friends or relatives were surprised when I began studying alligators. For several summers, much of my summer routine revolved around the movements of these animals. Since alligators are largely nocturnal creatures — and I'm a night person — this worked out fine. Much of my time was spent capturing, tagging and measuring alligators, but I also spent many hours simply observing them. As I followed the animals throughout several seasons, my appreciation and concern for these relics from an older time deepened.

In colonial times, alligators were probably found throughout coastal North Carolina, and some biologists feel that they may have lived as far north as the Great Dismal Swamp and Back Bay in Virginia. Today, surveys show that most alligators in North Carolina are found in the southeastern portion of the state. In decreasing numbers the animals are found north to the Alligator River and the

southern fringe of Albemarle Sound. As is often the case with animals at the edge of their range, alligators are much less abundant here in North Carolina than in the warmer states of the Deep South. A major factor in determining the northern range of the alligator seems to be the length of the warm season. An alligator must have a protracted period of heat to successfully complete its life cycle, and as temperatures cool growth rates and activity drop. At temperatures below 70 F, for example, alligators eat little if at all.

Winter is a quiet time for alligators in North Carolina. Although gators are a semi-tropical species, the animals handle cold quite well. In fact, no cold-caused mortality has been observed in North Carolina alligators. The animals spend most of the winter in "dens" or deep "alligator holes" in the marsh, or submerged in alligator holes, occasionally coming to the surface to breathe. No one really knows how long alligators can remain under water in winter. During periods of intense cold when an ice skim forms on the water, alligators will often poke their snouts up through the ice to breathe and may become frozen in place if the cold spell lasts. This does not seem to harm the animals, however. During prolonged warm spells the animals often emerge to bask in the sun.

With the arrival of warm weather in the spring, alligators begin to bask in the sun and also resume feeding. Part of my work was to conduct a food-habits study of alligators, and consequently we pumped the stomachs of captured alligators and examined the contents before releasing the animals unharmed. One of our conclusions was that there is very little that an alligator won't eat!

We found that young, hatchling alligators feed mostly on small aquatic life which includes insects, crustaceans and amphibians. Immature alligators add crawfish, birds and fish to this diet. A full-grown alligator, however, eats anything it can catch. Most of its diet is made up of fish, turtles, snakes and occasionally birds, but a gator may take prey as large as a deer. In addition, such curious items as pine knots, charcoal, shotgun shells, and pieces of brick may be found in a mature alligator's stomach. The digestive juices of an alligator are so acidic that they can break down even bony materials, and some biologists feel that the varied rubble ingested by alligators is used to help break up large food particles. My most unique find in the food-habits study was a metal leg band from an osprey.

In late spring an alligator's thoughts, such as they are, turn to love and courtship. Bellowing by both males and females is common, and the animals often move over extensive areas seeking a mate. Occasionally, these rambling gators will turn up in backyard ponds and other unlikely places. Mating usually takes place in the deepest open water available in coastal marshes, lakes and streams.

After mating, females will move into dense coastal swamps to build their nests. Using their powerful head, jaws and tail, the animals construct a conical mound of soil and plant material that is usually about 2½ feet high and 6 feet in diameter. Then, in early summer, the female lays 35 to 40 eggs on top of the mound and covers them with soil and vegetation. Snakes and turtles also frequently use these mounds as nesting sites. I once found an adult mud snake and six eggs in an active alligator nest.

The female will remain near the nest for the rest of the summer — guarding it from raccoons, otters, black bears and other predators that would like nothing better than to dig into the nest and feast on an alligator omlette. Many alligator nests are lost to this kind of predation.

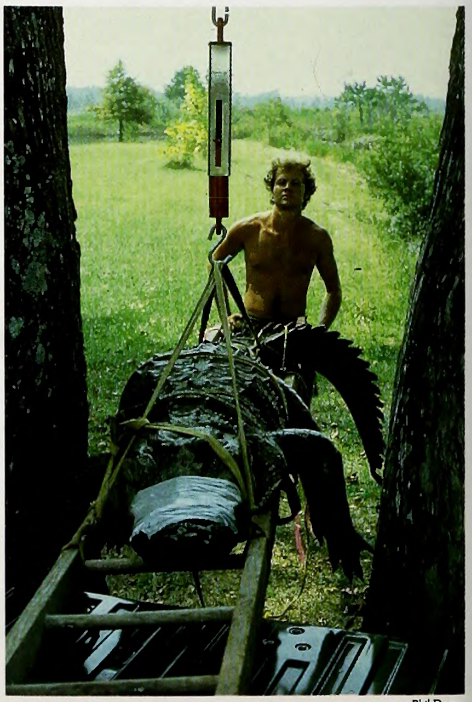
The males play little role in nesting, and generally stay in deeper, more open water. During the hottest part of the summer, both male and female alligators are most active at night and basking in the sun is confined to early morning. Ironically, while alligators thrive in a hot climate, they cannot tolerate long, direct exposure to a hot summer sun. When temperatures climb into the high 90s, alligators seek shaded wet areas or remain submerged.

In late summer, the eggs hatch. The female aids in this process by tearing open the side of the nest, and may assist her young by gently cracking the eggshells in her massive jaws and gingerly carrying her newly hatched offspring in her mouth to the water. The young alligators are about 9 to 10 inches long when they emerge from the eggs.

As they hatch, young alligators continuously make an "ump-ump-ump" sound. This noise helps keep the mother's attention focused on her young, and allows the hatchlings to stay close together. A disadvantage is that the noise attracts predators. I once located an active alligator nest by spotting four egrets roosting in nearby trees — eagerly awaiting the emergence of the young.

Life for newly hatched alligators is often short and violent. Although a lucky few may some day grow to be one of the largest predators in the state, superbly adapted to night hunting and with no natural

Richard Bird



Phil Doerr

Alligators are among the last of the order which included dinosaurs. They have remained unchanged for 100 million years, and when you see an alligator you're as close to a dinosaur as you'll be.

Full grown alligator (above) is an awesome sight as it slips beneath the water. Few of the tiny hatchlings (right) will escape snakes, turtles and other predators long enough to grow to that size. Biologists are studying the range and distribution of North Carolina's alligators (left), as well as their population levels. There are probably several thousand alligators in the state, although habitat loss is threatening their numbers.

Phil Doerr

enemies, the odds are against them. Their future prey takes a heavy toll. Young alligators are eaten by snakes, turtles, raccoons, otters, fish, bigger alligators, wading birds, and even large bullfrogs.

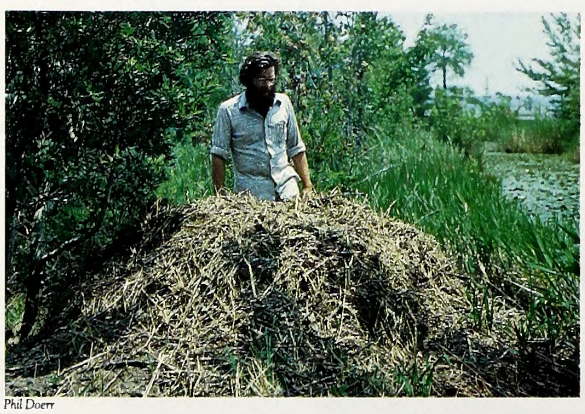
In the fall, alligators prepare for the coming winter. Hatchlings usually remain together in groups or "pods" near their nest, although they may move several hundred feet in their first year. Sometimes these pods will stay together for several years. Both young and adult alligators take advantage of the last opportunities to bask in the rays of the Indian summer sun. As the weather cools, they become less active and finally stop feeding. The adults move to deeper waters or dens for the winter. These dens are generally holes that are dug up under the bank, and the entrances are usually submerged — although a drop in water levels may expose the entrance.

An amusing story about an alligator den is included in John Lawson's book, *A New Voyage to Carolina.* Lawson was North

Manley Fuller

Tim Hergenrader

Cypress-fringed waterways in the southeastern part of the state (above) provide good habitat for alligators, even though gators are at the northern edge of their range in North Carolina. The shorter growing season here means that alligators grow more slowly than in Florida or Louisiana, and few large gators are found. Alligators nest on mounds (near right) and hollow dens out of banks (far right). In summer, these reptiles are active at night and rest during the day.



Phil Doerr

In Florida, an alligator grows six feet long in eight to nine years. Our studies suggest it takes 16 to 20 years for an alligator to reach this length here.

Carolina's first surveyor-general, and traveled extensively among the Indians in North and South Carolina during the early 1700s. Soon after he arrived in the New World from England, he built a cabin where Lawson Creek joins the Neuse River — not far from the present site of New Bern. He shared this cabin one winter with a bulldog and an Indian companion, and when spring came he was in for a surprise.

"I was sitting alone by the fireside," wrote Lawson, "the Indian fellow being gone to the Town to see his Relations; so that there was no body in the House but my self and my Dog; when, all of a sudden, this ill-favored Neighbor of mine, set up such a Roaring, that he made the House shake about my Ears, and so continued four or five times. The Dog Stared, as if he was frightened out of his Senses; nor indeed, could I imagine what it was. Being at that time amongst none but Savages, I began to suspect, they were working some Piece of Conjuration under my House, to get away my goods. At last, my Man came in, to whom when I told the Story, he laugh'd at me, and presently undeceiv'd me, by telling me what it was that made the noise."

John Lawson evidently had the misfortune to build his cabin directly over an alligator den, and the gator was none too pleased.

The cold weather that drives alligators to their dens in winter certainly limits their growth in North Carolina, and this in turn indirectly affects their reproduction and population. One of the most common questions I hear is "how many alligators are there in North Carolina?" That's a tough question, and no one really knows. The alligator population in North Carolina probably numbers several thousand, but they are certainly less numerous here than in warmer states in the heart of their range. There are several reasons. In Florida and Louisiana, for example, an alligator grows to sexual maturity at six feet in length in eight to nine years. Our growth rate studies suggest that it takes 16 to 20 years for an alligator to reach this length in North Carolina. The longer growing season farther South accounts for the accelerated growth rate. In turn, growth rates affect populations. Since it takes longer for alligators to reach maturity in North Carolina, more are lost to predation and other natural mortality before they are able to breed. There are also fewer extensive freshwater marshes in North Carolina than in Florida and Louisiana.

As expected, alligators also tend to be smaller in North Carolina than in the Deep South. The largest alligator ever recorded was found dead in a swamp in Louisiana in the late 1800s, and measured a whopping 19 feet, 2 inches. In recent times, male alligators exceeding 14 feet have been reported in Florida and Louisiana. The largest alligator recorded in North Carolina was illegally shot in Carteret County in 1981, and measured 12 feet, 7 inches (the two men responsible for this crime were both apprehended and successfully prosecuted). By counting the annual rings in the femur of the animal, we estimated its age between 42-45 years old.

Still, there are some large alligators in North Carolina, and I would not be surprised if a 13-footer showed up. Last year, two 13-footers were found dead in South Carolina. The largest alligator I have seen in North Carolina was on a lake in the Croatan National Forest. While doing some night field work, we followed this alligator for several minutes. I would never allow our boat to come closer than about 15 feet, and I am confident that this animal exceeded 12 feet. Once the alligator surfaced almost completely, and except for the bony scutes its broad back looked like that of a hippopotamus. I have always had mixed emotions about whether we wanted to catch that gator from our 14-foot boat, and it was probably best for everyone that the animal soon tired of our bright lights and sank out of sight in the dark, tea-stained waters. Interestingly, H.H. Brimley, a famous naturalist and early director of the N.C. Museum of Natural History, noted that the largest alligator he had ever seen was in that same lake about 50 years ago.

What does the future hold for alligators in North Carolina? Much depends on us. Since this country was settled, alligators have suffered. Early settlers soon acquired a taste for alligator meat from the Indians, and also used alligator teeth as "bullet starters" for their muskets. Later, alligators were slaughtered by the millions for their hides throughout the coastal South.

In 1973 alligators finally received protection through the Federal Endangered Species Act, and it became illegal to possess or export alligator hides. The elimination of the hide trade made a recovery possible for the animals, and today alligators are quite abundant in the heart of their range. In Florida and Louisiana, the animals have multiplied to the point where carefully regulated harvests of alligators are allowed. In North Carolina, where alligator populations and reproduction are low, it is doubtful that an alligator season will be allowed in the near future. Although the animals are strictly protected, illegal hunting is still a problem. Over 40 rotting alligator hides were found in a cache in Pender County a few years ago, and large alligators are occasionally found dead from gunshot wounds.

Like most wildlife species, however, the biggest threat to alligators is degradation and loss of habitat. Draining and clearing of coastal wetlands — including freshwater and brackish marshes and swamps — for agriculture, forestry and other uses has resulted in serious habitat loss. This may also account for an increase in alligator sightings. As habitat is cleared — and as more vacation homes are built in coastal wetlands — the animals seek new living space, often close to man.

Why save alligators? There are a number of reasons. Alligators are good for the environment. In times of drought, alligator holes offer valuable sources of water for fish and wildlife. Alligators may also improve fishing by preying on slow-moving nongame fish, such as gar and bowfin, that compete with game fish. In fact, the best bass fishing in Florida is found in lakes that have high alligator populations.

Alligators are even becoming valuable research animals for bio-medical studies. Why? They are one of the few egg-hatching animals which possess a secondary palate. Because of this trait, alligators may be cultured under laboratory conditions and embryos have been used in experimental micro-surgery that may one day be applied to human embryos with developmental problems involving the palate.

Finally, alligators are among the last surviving members of the Archosauria, the Super Order which included most dinosaurs. They have remained unchanged for over 100 million years, and when you see an alligator you're as close to a dinosaur as you'll ever be. Southern swamps just wouldn't be the same without them. ⊠

Alligators are among the many nongame wildlife species which may benefit from the N.C. Wildlife Resources Commission's nongame program. Nongame wildlife species are those which cannot be legally taken by hunting or fishing. Tax deductible donations to this nongame fund can be made at any time, or you can donate a portion or all of your tax refund each year by filling out the appropriate line on your tax form.

Sea Gypsy

Harold Quidley

Almost every beach visitor has seen these odd, jet-propelled jellyfish gliding just beneath the water's surface.

by Lawrence S. Earley

The colorful creature on these pages is a great sea-wanderer and yet it is most often seen washed ashore, its journeys over.

The "cabbagehead" *(Stomolophus meleagris),* like other jellyfish, drifts on the ocean currents that ceaselessly cross the globe. It belongs to the coelenterates, an animal group which also contains sea anemones and coral. Although coelenterates comprise some of nature's most primitive life forms, the jellyfish are more advanced than their kin. Many coelenterates live attached to stones on the sea bottom in a stationary, almost plantlike state. But the true jellyfish voyage on the ocean currents as part of the teeming plankton soup that feeds innumerable sea creatures.

Also called the "cannonball," after its surprising toe-stubbing bulk, this jellyfish is probably the most common of its kind along the North Carolina coast in summer and fall, though it rarely pushes farther north than Cape Hatteras. Puzzled pier fishermen sometimes see them float by in great numbers, as if someone had dumped a load of melons overboard.

A cabbagehead is mostly water — 95 percent water, to be exact. For comparison's sake humans are mostly water, too, but only about 70 percent. All this water is organized into a thick jelly layer sandwiched between a protective outer skin and an inner layer consisting of the jellyfish's inner organs. Like other jellyfish, and, indeed all coelenterates, it lacks an intestine (the word coelenterate comes from Greek words meaning "hollow gut"). The mouth is the cabbagehead's only body opening and it is located beneath its dome. Around the mouth are short appendages called mouth arms which are covered with a sticky, mucous coating that helps to trap food and convey it to the opening. Along the edges of the dome are the cabbagehead's tentacles.

The tentacles are the jellyfish's weapons, and in many jellyfish they are formidable, indeed. Each tentacle has thousands of capsules beneath the skin containing coiled, hollow threads tipped with sharp barbs. When triggers on the skin surface are brushed — by a small fish, for example — the harpoonlike threads are unleashed with explosive force, driving the poison-dripping darts beneath the fish's skin. Paralyzed by the poison, the fish is easily eaten. Most jellyfish merely sting when touched by humans, but some inflict painful injuries and leave ugly welts. The Portuguese man-o-war — which is actually not a true jellyfish, but a colony of individual organisms acting as a single unit — has killed some swimmers with a poison 75 percent as potent as a king cobra's.

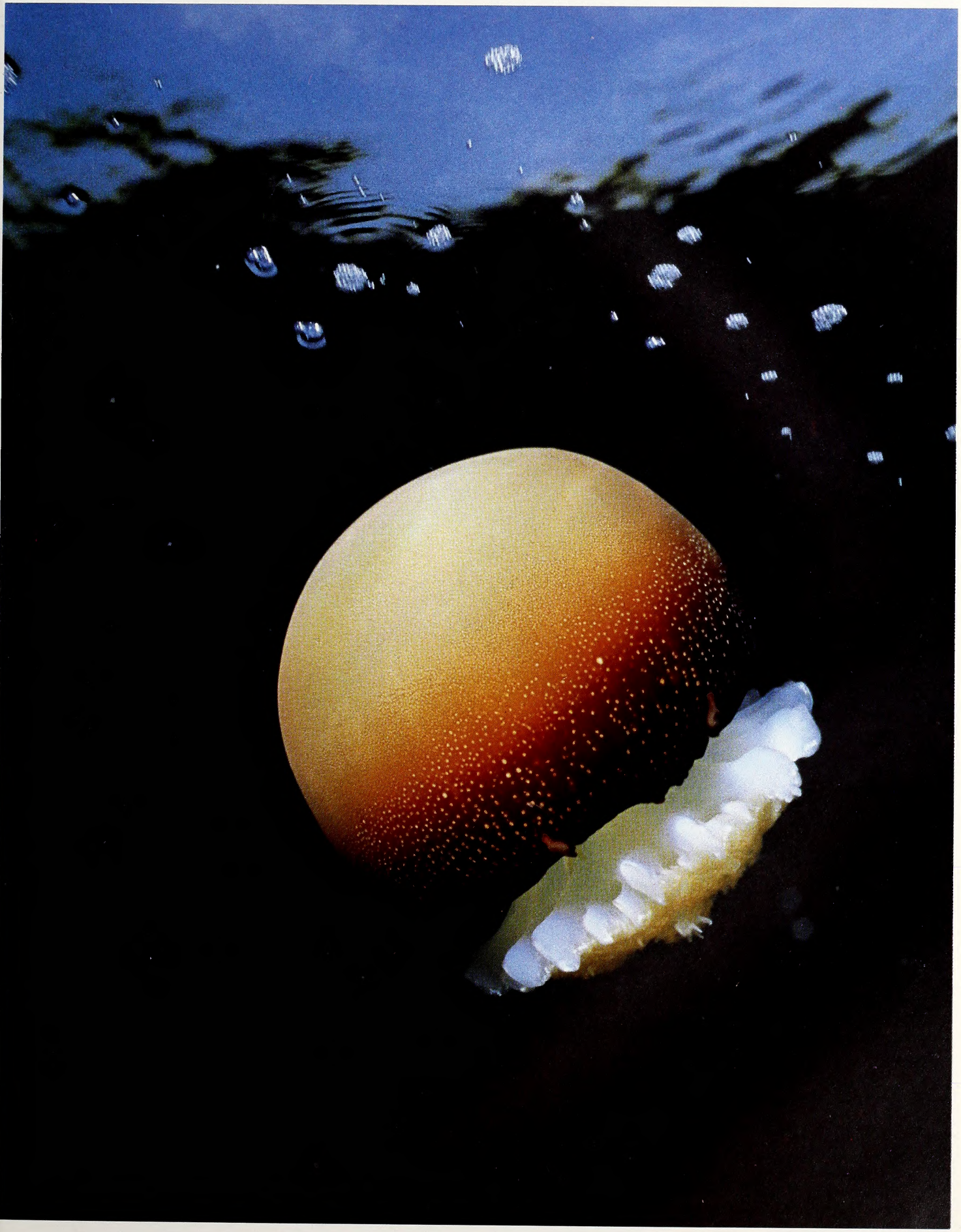
The cabbagehead is not as dangerous as some jellyfish, however. It is possible to lift it with two hands and not get stung at all.

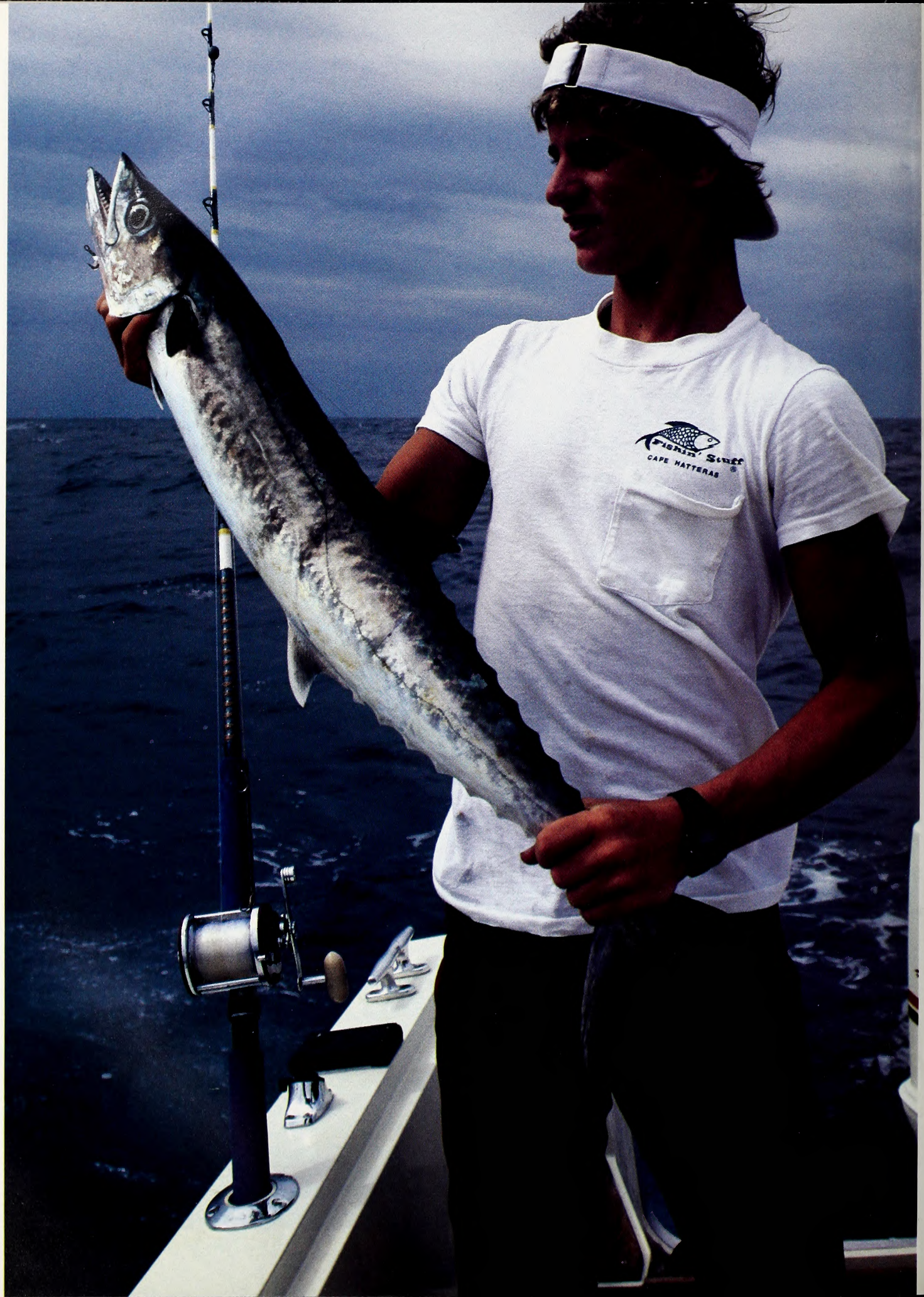
Cabbageheads have male and female sexes, and their reproductive process is familiar — up to a point. Sperm and eggs are emitted into the water where the egg is fertilized. The fertilized egg propels itself about in the water until it settles on the bottom. There it becomes attached almost like a plant, dividing asexually into layers of "young" that look to observers very much like stacks of pancakes or saucers. After awhile, the layers separate, invert and float off as true jellyfish. What makes jellyfish interesting and complex is that the fertilized eggs of some species don't go through this attached "polyp" stage, but grow directly into young jellyfish.

Cabbageheads grow to about 7 or 8 inches across. Some species are much smaller, while an Arctic species measures 6 feet across with tentacles 75 feet long and weighs as much as a ton. With its brownish umbrella and white underparts, the cabbagehead is pretty in the water, although other jellyfish are even more beautiful. One 2-inch species common in deeper waters, the purple jellyfish *(Pelagia Noctiluca),* glows with a lovely purple-blue luminescence.

Like most inhabitants of the sea, the cabbagehead is more often seen after it has completely lost its dignity. Detached from the ocean and eddied to shore, it's merely a rotting gelatinous *thing,* something to avoid. In the ocean, though, it's surprisingly graceful and colorful, a far wanderer with a life history as interesting as any creature's. ⊠

For more information about North Carolina's jellyfish, see *Jellyfishes and Ctenophores of North Carolina* by Dr. Frank Schwartz. This booklet is available for $.50 from Dr. Frank Schwartz, Institute of Marine Sciences, Morehead City, N.C. 28557.




Fishin' Stuff
CAPE HATTERAS

SLOW TROLL FOR KINGS

written and photographed
by Joel Arrington

The newest and most effective tactic for catching big king mackerel is slow-trolling with live bait.

There is a minor revolution in king mackerel fishing taking place along North Carolina's coast. In recent years, practitioners of the ancient, but now revived and sophisticated, technique of slow trolling live baits have swept king mackerel tournaments from Florida to North Carolina.

Look at the record: Since 1981, North Carolina slow-trollers have won every local king mackerel tournament, including the Got-Em-On Classic at Carolina Beach, the Wrightsville Beach King Mackerel Tournament, the Atlantic Beach Tournament, the U.S. Open King Mackerel Tournament at Southport, and the East Coast Open at Kure Beach. Some of these contests have had over 500 boats entered, with anglers from all over the Southeast.

Tar Heel competitors also have been awesome on the road. For example, in the 1982 Greater Jacksonville, Florida, Kingfish Tournament, which is the largest mackerel contest in the country with over 700 boats entered, five from the Wilmington-Southport area registered and three finished in the money. In '83, 12 local boats went to Jacksonville and, incredibly, seven placed in the money. This time, there were over 840 boats entered.

Successful slow trolling requires an ample supply of live baits, and special live-bait wells are standard equipment on most boats (above). This king mackerel may be a keeper, but much larger kings are taken by slow trolling tactics.

Clayton Kirby of Wilmington, a daily first place winner in 1982, won the top prize of 1983 (worth more than $30,000 in cash and merchandise) for first place in the total weight division. His top five fish weighed just over 100 pounds.

Prior to the '83 Jacksonville tournament, a one-day contest was held in which the top kingfish anglers in the country entered 43 boats at $1000 each. First and second places were taken by slow-trolling teams from Carolina Beach. The technique works.

There is no telling how long people have been hooking up small live fish and pulling them slowly through the water. It is an old fishing method that depends upon taking the bait to the fish rather than waiting for the quarry to come by a fixed position. Although not a new technique, innovative saltwater anglers have only recently developed and refined slow trolling beyond any previous level of sophistication.

Live bait fishing for king mackerel in North Carolina was first extensively applied on piers and the technique reached a high level of development there in the 1960s. Then boaters began using it, principally at Cape Lookout and off Cape Fear, sometimes employing balloons for floats. But almost always it was from anchored boats, although certainly a few anglers must have drifted.

Early on, you saw a lot of heavy tackle because many anglers did not understand the basic nature of king mackerel and the practical physics involved in catching big fish on light lines. Beginners were startled by hard strikes followed by long blistering runs. Afraid they would lose these rapidly departing fish, they clamped down their drags and consequently either broke lines or pulled hooks. Next time, they were outfitted with bigger rods and reels and stouter hooks, but either they got few strikes or they still were broken off or hooks failed to hold. With experience, the reason became obvious. For its first run a king mackerel is extremely fleet and powerful. Then it poops out and may be reeled up with only moderate effort, lacking at boatside the stamina of, for example, an amberjack or red drum. Once this lesson was learned, float-fishermen began using lighter tackle, letting the fish run against only a light drag, and catching many more kings.

But float-fishing, as good a technique as it is, does not permit the angler to go to the fish or to cover a number of likely locations. If he were lucky enough to anchor where kings happen to be in residence or passing by, fine. But for more consistent results, the fisherman needs to cover a lot of water, and, because kings are almost always associated with structure, a lot of wrecks, drop-offs and pieces of rough bottom. He needs to be able to return to the precise location of former success, often miles at sea.

So someone, no one is really sure who, (if, indeed it was only one person) began to troll live baits slowly over likely king mackerel hangouts. This may have been in the early 1970s. The technique was so successful that word spread, others took it up, added their own twists and refinements, some that worked, some that didn't, and the best of these anglers began entering the growing number of king mackerel tournaments that, just a few years ago, began springing up on the Atlantic Coast from Morehead City to Florida.

However you may feel about tournaments, there is no question but that competitive fishing provided the impetus for development of live bait slow trolling. In the same way that auto racing informs engineering developments that trickle down to your car, and tournament bass fishing results in better tackle and technique for non-competitors, king mackerel tournaments are the crucible in which angling methods and equipment are tested.

On a sloppy day last summer, I went along on a trip off Carolina Beach with Chuck Walker, who placed second in the 1982 Wrightsville Beach King Mackerel Tournament, his son, Clay, and Gerald Cooney, a fishing writer from Wilmington and a tournament competitor himself. We began before dawn looking for bait in the

mouth of the Cape Fear River near Snows Cut where schools of menhaden had been present just days before.

Menhaden, locally called pogies, are the bait of choice for nearly all slow-trollers, although pinfish, thread herring, spot, popeye mullet, and miscellaneous other small fish are used out of convenience or necessity. When they are available, menhaden are by far easier to catch in numbers and handle, and, some experts believe, they troll better than anything else. Bluefish, according to Cooney, tend to die on offshore trips, and pinfish do not pull well, often spinning or turning on their sides and planing to the surface.

Much of the technique of slow-trolling is involved with finding and keeping a supply of live baits. Having lively ones of the right kind at the right time can mean winning or losing an important tournament or, for non-competitors, fish in the box on a weekend trip. Menhaden are difficult, but not impossible, to keep overnight. Chuck Walker said he has used a cotton net suspended from a PVC ring in calm water with some success. Nylon nets will chafe the baits, causing most to die, he said. Champion bait gatherers throw a 12-foot cast net, which is no mean feat even on your unobstructed lawn. To handle such a large net from the bow of a bobbing boat is quite a skill. Most casual fishermen will use a 4½ to 6-footer, which measurement is the radius of the net.

Menhaden will not keep long in a rectangular bait well because of their habit of "nosing up" in the corners and suffocating. Serious anglers these days are using round polyurethane tanks with through-hull fittings and pumps with overboard discharge. Underway, a scoop supplies water to the tank at its bottom and an overflow near the top takes it away. At rest, a pump supplies sufficient water to keep a hundred or more menhaden happy in a 35-gallon tank.

Pogy schools were conspicuous by their absence in the river that morning, but we had a call from "Widow Maker" on the CB that there were schools of bait near Williams Landing in the Intracoastal Waterway just a few miles away. By the time we arrived, Walker's fishing buddies had a net over a school and generously held them for us. Our tank loaded, we wallowed out Carolina Beach Inlet into a gray and angry ocean.

The forecast was for clearing, but it never occurred that day. We headed toward WR4 wreck with all canvas up, taking spray on every sea. Short of the buoy by nearly a mile, the fathometer showed a rough piece of bottom and bait over it. We just happened over this likely spot. Walker throttled back and announced we would fish there.

Chuck Walker represents a growing category of serious coastal anglers. They are small boat fishermen who stay abreast of the most recent developments in electronics for navigation and communication and who are on the leading edge of light tackle saltwater fishing developments in this country. They acquire virtually every new technological development as soon as it comes on the market to see if it will help in their kind of fishing. All their equipment, from outboard motors to bait well, Loran C, VHF radios and tackle is current and in good operating order, and they know how to use it.

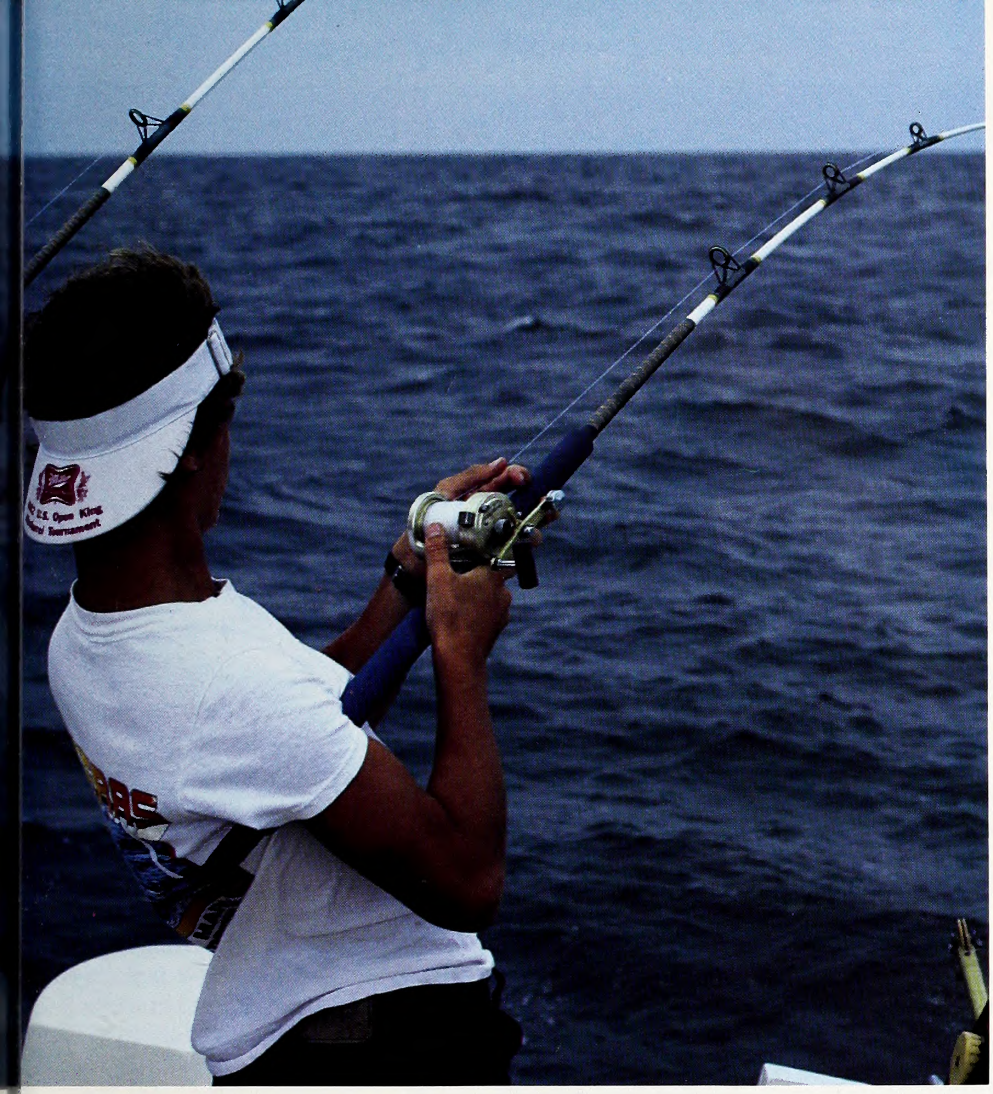
Clay and Cooney put over baits on three surface lines and one on the downrigger, holding on with one hand in the rough sea and working with the other. If the weather had been better they would have worked up to six lines. Rods were 7-foot, medium action with foam-wrapped, slotted butts and aluminum oxide guides. They had conventional reels with 20-pound test monofilament line.

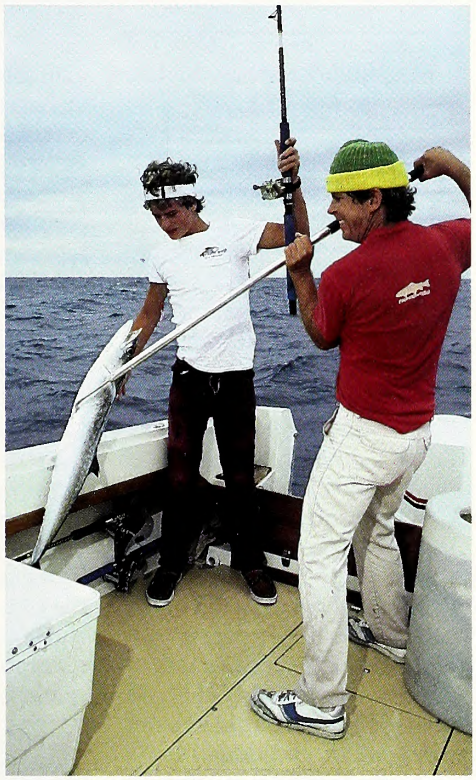
Every slow-troller has his personal variation on a terminal tackle theme. The leader may be either mono, wire or braided and tests from about 20 to 40 pounds. Usually it's 3- to 4-feet long and attached to the line with a small barrel swivel. The live bait hook is often a No. 1 short shank O'Shaughnessy. Below this hook on a 5-to-6-inch dropper is a No. 4 extra strong treble. These hooks are either bronzed or sprayed black to reduce glare. Infinite variations in this rig occur among the slow-trolling fraternity. As additional attractors, Cooney sometimes wraps colored pipe cleaners — which he buys in hobby shops — around the leader a few inches above the single hook. Others add beads or chenille to the leader or slip sinkers to the line ahead of the barrel swivel. Sometimes mackerel prefer their baits a little under the surface, according to Cooney. Most experienced slow-trollers would not go out with less than a dozen leader rigs made up and packaged in plastic bags ready for quick use.

Although we did not chum that day, some of the top practitioners do. They may distribute ground menhaden or cat food (processed fish, not cereal) mixed with water around a fishing location and double back to work the slick. If they are lucky, it will have attracted bait and kings.

Walker and Cooney emphasized the recommended way to set hooks on kingfish. Set a light drag initially, they

Live baits are hooked through the lips so that they can swim naturally while the boat runs slowly at about the same pace as the swimming bait. Menhaden are favored as baits because they can survive in a live well for the duration of a trip and swim well when used as bait. Also, kings are very fond of them.





With a fish on, other live baits are quickly reeled in so they don't tangle with a hooked fish. Kings are virtually unstoppable on their first long run, and anglers have learned to set the drag lightly and let 'em go (upper left). Experienced fishermen also wait until a fish is tired before bringing it alongside to gaff.

advised, then when a fish hits, pick up the rod and let the king run with only light to medium pressure. Do not set the hook until the fish stops; then it is permissible to raise the rod tip delicately to be sure the hooks are in. Small hooks are easy to pull out, particularly the small treble dropper that often is only skin deep. Incidentally, fish caught on this type tackle are not eligible for world records under International Game Fish Association rules.

Large king mackerel are loners or travel in small schools. If you get into small summer kings, or "snakes," chances of catching a big fish are slim. Experts after trophies will move to new structure.

Off the North Carolina coast, king mackerel can be caught at any time of year. In winter, they hold along the western edge of the Gulf Stream in deep water. As the ocean warms in the spring, they begin moving inshore and may be along the beach by May and out as far as the 100-foot depth line. In October, they begin to disappear from inshore waters off the Outer Banks and usually are 20 or more miles off Wrightsville Beach by Thanksgiving.

Trolling speed is critical, according to Walker. His outboard is equipped with a moveable baffle behind the propeller which slows forward movement. Some anglers drag one or more 5-gallon buckets, but they can get in the way when there is a fish on. A 20-foot boat with an 8-foot beam and a single large outboard attains the correct trolling speed at approximately 400 to 500 rpms in average seas, according to Cooney. Wind, current and trolling direction can vary that substantially. At ideal speed, a bait can swim ahead for a short burst, but it should not be able to stay ahead for long. Neither should it be pulled to the surface where it will skip.

The nine kings they caught that gray day were not in the tournament winning class, but rather they were ordinary summer kings weighing from six to about 12 pounds. Some were caught on the downrigger, some near the surface, but all hit as we repeatedly passed over the ledge which Walker located with his fathometer. Strikes were predictable as we passed over the spot, but by the time we had boated a fish, our rapid drift had moved us a full microsecond off the ledge and we would have to work laboriously back against the seas. But this ability to fish a precise spot (and to locate another one if necessary) is one thing that makes modern live bait fishing so productive, and is attributable to improvements in Loran navigation and the recent availability of relatively inexpensive receivers. Moderately sophisticated units list for about $1000 nowadays and sell for much less. All but the most basic models will give the operator a course home, as Chuck Walker's did, and indicate when, and in what direction, he is off course.

It usually takes a fish pushing 40 pounds or more to win a tournament these days. Very few that size are ever caught by conventional trolling, but live-bait slow-trollers do it with surprising and enviable regularity. Non-competitors will settle for much less, however, on weekend fishing trips, which are now much more likely to be productive because of techniques developed by a few fishermen on North Carolina's southern coast. ⊠

Violators Foot The Bill

Replacement Costs Put Price On Wildlife

Written and Edited by Mark Taylor

Would you pay $800 for a black bear? How about $2,300 for a bald eagle, or $400 for a wild turkey?

The animals are not for sale, but those who violate wildlife regulations in North Carolina could still end up paying for them. Since 1980, a provision in the state's laws has allowed the N.C. Wildlife Resources Commission to collect "wildlife replacement costs" in court cases for illegally taken wildlife. Almost $50,000 has been collected as wildlife replacement costs since the provision was passed, and has been plowed back into wildlife conservation programs.

"Levying wildlife replacement costs has become a common practice in courts throughout the state," said Colonel Winfield Rhyne of the Division of Enforcement for the Wildlife Commission. "These penalties are usually assessed in the more serious wildlife cases — especially those involving deer, black bear, wild turkey, and occasionally trout. Replacement costs are also commonly assessed in cases involving commercialization of wildlife."

The replacement costs for wildlife are high. For a deer, the replacement cost is $279, and for a black bear it's $800. A wild turkey costs $400, and the replacement cost for any endangered species is $2,300. These cost values are not arbitrary figures, but were determined by a team of wildlife biologists in 1980. The team used data from other states, in addition to information from the Commission's wildlife management programs, to determine a fair replacement value for wildlife species.

"Several factors were considered when we assigned replacement values to our wildlife species," said Grady Barnes, section manager for research and regulations for the Wildlife Commission's Division of Wildlife Management. "For example, the type of habitat needed by the animal is a key factor. Most endangered species need very specific habitat types which are often quite rare, so the cost of replacing an endangered species through a restoration program is high. A similar situation occurs with black bears. These animals are a wilderness species, and individual animals require large blocks of wild habitat — which is hard to find in this day and age. So, the replacement cost for a black bear is considerable.

The replacement costs for animals with larger populations and more general habitat needs are lower. Deer, for example, use a wide variety of habitats, and are fairly abundant. We know that it costs an average of $300 per animal to live-trap and relocate deer to new areas — we've been doing this for years through our deer-restoration programs. In contrast, replacement costs are quite low for some small-game species which are found in large numbers throughout the state. The replacement cost for a rabbit, for example, is $6."

Dr. Doug Miller

A Price On Its Head: *Courts can assess wildlife replacement costs in wildlife cases, and violations can get expensive. The replacement cost for a bobcat, for example, is $300. Funds collected as replacement costs are returned to the Wildlife Commission, and are used in wildlife conservation and restoration programs.*

Although funds collected as replacement costs don't replace the particular animals that were killed, these funds are used for general Wildlife Commission programs — which include restoration and management programs for big game, small game, and nongame and endangered species.

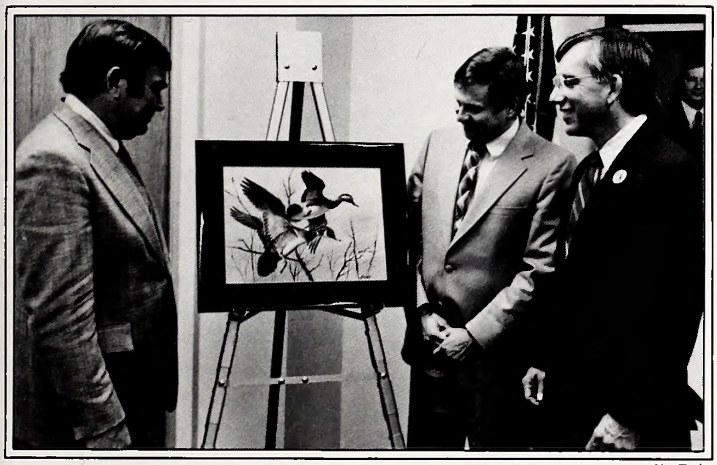
Will the widespread use of wildlife replacement costs also act as a deterrent to wildlife violators? Wildlife enforcement officials are optimistic.

"When wildlife replacement costs are added to fines and court costs, in addition to confiscation of vehicles and firearms in some cases, the wildlife violator can end up paying a stiff penalty for his crime," said Rhyne. "As this provision is used more in the future, people will think twice before they take wildlife illegally.

"However, we would also like to see wildlife replacement costs used more by the courts for another reason. The Wildlife Commission does not receive any funds from fines or court costs in wildlife cases. Funds generated by fines are earmarked for local school districts, and court costs help support the administrative costs of our judicial system. So, a wildlife violator may pay a fine and court costs and still do nothing to help wildlife. We feel that those who steal from our wildlife heritage by killing wildlife illegally should help replace the wildlife they have taken. Assessing wildlife replacement costs helps to make this possible."

Wood Ducks Featured

New Waterfowl Stamp Selected



Ken Taylor

A New Duck Stamp: *This painting of wood ducks by wildlife artist James Killen of Minnesota was recently selected as the 1984 North Carolina waterfowl stamp. The stamps will go on sale at license agents on July 1, and art dealers throughout the state are taking advance orders for prints (these prints are not being sold by the Wildlife Commission). Here, David Allsbrook of Scotland Neck (left), wildlife commissioner for District 3, Vernon Bevill, executive director of the Wildlife Commission, and J. Robert Gordon of Laurinburg, chairman of the Wildlife Commission, admire Killen's painting.*

Youth Program Popular

Wildlife Rendezvous Slated

Is your son or daughter interested in the outdoors? Bet they'd enjoy the Second Annual Fur, Fish'N Game Rendezvous. The event will be held from July 8-13 at the Millstone 4-H Camp near Ellerbe, and is open to young men and women from 13 to 17 years of age. The Rendezvous is sponsored by the N.C. Agricultural Extension Service, N.C. Wildlife Resources Commission, N.C. Wildlife Federation, and the National Hunters Association.

Outdoor subjects covered at the Rendezvous will include forestry, wildlife and fishery management and conservation, hunting and hunter safety, fishing, trapping, canoeing, archery, wildlife photography, taxidermy and others. The subjects will be taught by knowledgeable instructors including personnel from the N.C. Wildlife Resources Commission.

"The Rendezvous offers youngsters who are interested in the outdoors an excellent opportunity to hone outdoor skills, and to learn to use the outdoors safely and ethically," said Rick Estes, coordinator of education for the N.C. Wildlife Resources Commission. "In addition, it offers students a chance to explore career opportunities in the field of natural resources."

The total cost of the Rendezvous is $100 per student, and information and registration forms are available from your local 4-H agent or the N.C. Agricultural Extension Service, 4-H Department, Box 7606, Raleigh, N.C. 27695

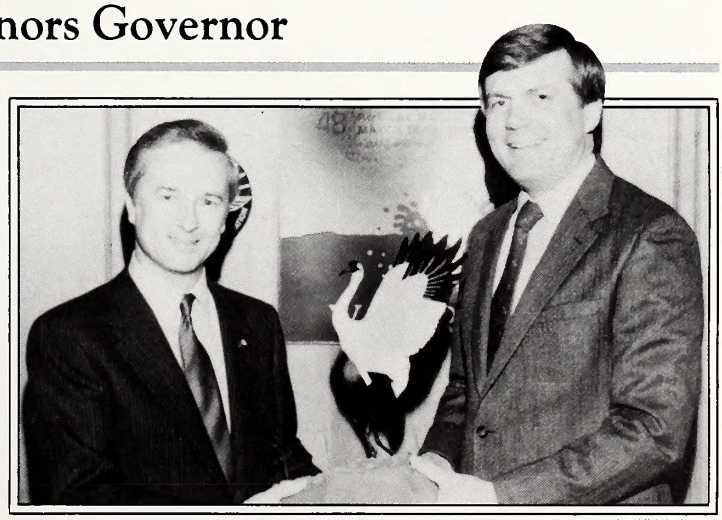
Conservation Record Cited

Federation Honors Governor

North Carolina Governor James B. Hunt Jr. recently received a 1983 National Conservation Award from the National Wildlife Federation. The award was presented at the Federation's annual meeting in Atlanta, Georgia.

"For more than seven years, Governor Hunt's personal belief in environmental quality has been translated into working programs which affect the daily lives of all North Carolina residents," said Dr. Jay Hair, executive vice-president of the National Wildlife Federation and a former professor of zoology at N.C. State University. "His actions and effectiveness in institutionalizing programs for the future are notable measures of his commitment to conservation and responsible economic growth in the state."

Hair adds that Governor Hunt has appointed key conservation and environmental leaders to decision-making boards — ensuring that the voice of conservation be heard throughout state government. In addition, his administration supported the implementation of North Carolina's Environmental Quality Act, and in 1981 the state sued the Department of Interior over the proposed leasing of tracts off the North Carolina coast for offshore oil development.



National Wildlife Federation

Honored For Conservation: *North Carolina Governor James B. Hunt, Jr. recently received the Conservationist of the Year award from the National Wildlife Federation. Here, Governor Hunt (left) accepts the award from Dr. Jay Hair, executive vice-president of the Federation and a former professor of zoology at N.C. State University.*

Wins National Trial

Cullowhee Beagle Number One In Its Class

Mike Pressley of Cullowhee was only 13-years old when he entered his 13-inch male beagle, "Pressley's Short Pacer," in the National Gun Dog Run-Off last year in Gates City, Virginia. During the three-day competition his dog was graded on conformation to breed standards and ability to hunt rabbits. When it was over, Mike walked away with a trophy. And not just any trophy. His dog captured the highest honors and was picked "Top Gun Dog" beagle in its class in the nation.

"I just went crazy," said Mike. One judge commented that Mike's dog was the best he had judged in the previous five years.

Raising a championship beagle is not something that just happens. Mike and his dog spent many hours preparing for the competition as they successfully worked their way through the state and regional preliminary trials. "Every evening after school Pacer and I would go out and run rabbits," said Mike. He admits that it was not all work, however. "I like to hunt and be outside, and training Pacer allowed me to do that."

The Pressley name is not new to the winner's circle. Mike's father, Clarence, his grandfather, Cling "Papa" and Uncle Ray have consistently had winning dogs in the trials. The family credits "Papa" with starting the Pressley tradition of raising championship beagles, but it is Ray who is probably the most renowned in gun-dog circles today. Mike attributes his success to Ray's coaching.

"It's a good clean, healthy sport," says Mike's father, "and I know when Mike is with the dogs he is enjoying himself and learning about sportsmanship and responsibility."

If history repeats itself, there is a good chance Mike will not be the youngest Pressley entering gun dog competition for long. Ray has two boys, 4-year old Brandon and 10-year old Darren, who are already showing interest in the dogs. You can bet that when they are ready, "Papa" Pressley will have a new litter of beagle pups from which they can choose.

Jay Davies

Jay Davies

Quite A Dog: *Mike Pressley of Cullowhee recently entered his beagle, "Pressley's Short Pacer," in the national gun dog trials in Virginia. Pressley's dog finished first in its class. The young man says that raising a championship dog is a lot of work, but gives you an excuse to run rabbits after school every day.*

Plaque Presented To Family

Commission Honors Slain Wildlife Officer

Honoring A Slain Officer: *The Wildlife Commission's Division of Enforcement recently presented a plaque to Mr. and Mrs. Willie and Edna Mayse of Chapel Hill honoring their son, Lloyd O'Neil Mayse. Officer Mayse was shot and killed on Thanksgiving Day, 1980 while attempting to apprehend two illegal hunters in Northampton County. In addition, Mr. and Mrs. Mayse were presented with their son's badge, service revolver, and a Medal of Honor award from the American Police Association. From left to right are Major Ray Johnson of the Division of Enforcement, Lieutenant Sam Wright, safety officer for District 3, Mr. and Mrs. Mayse, Captain Rueben Crumpton, wildlife enforcement supervisor for District 3, and Lieutenant Tommy Williams, assistant enforcement supervisor for District 5.*

Mike Zetts

"Lloyd Mayse was a fine wildlife officer," said Colonel Winfield Rhyne of the Commission's Division of Enforcement. "We wish to honor his parents with this presentation, and deeply regret the loss of their son."

Steady Touch Bags Jacks

Missing a lot of strikes when fishing for chain pickerel? You might try maintaining a steady lure retrieve.

Pickerel — or jack as they're often called — have long, slender bodies, and depend on a single, sudden burst of speed to catch their prey. They are unable to change direction quickly to respond to the kind of erratic retrieve that is often used for bass.

If you're fishing for jack with live bait — shiners work well — allow the fish to take the bait for a few seconds before setting the hook. Jack seize their prey by its side and then manipulate it head first down their throats. Consequently, a quick setting of the hook will often result in a missed fish.

Aircraft Aid Enforcement

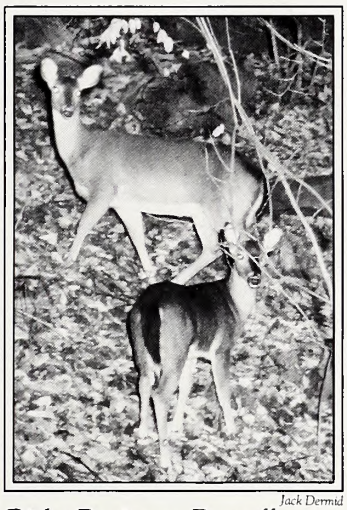
Night Deer Hunting Arrests Hit Record High

Many of North Carolina's illegal night deer hunters had a bad year in 1983. A record 658 arrests were made for this offense statewide last year compared to 511 cases in 1982.

"There are several factors that account for the increase in night deer-hunting cases last year," said Colonel Winfield Rhyne of the Division of Enforcement of the N.C. Wildlife Commission. "First, we're placing a great emphasis on major wildlife violations — which include night deer hunting. Many officers in the field have also received new patrol cars or 4-wheel drive vehicles — replacing worn-out equipment. This has made for effective patrols, especially in remote areas."

The biggest increases in arrests were made in wildlife Districts 3 and 4, which include the eastern Piedmont and southeastern portions of the state — and wildlife District 9 in the far western mountains. In wildlife Districts 3 and 4 arrests for night deer hunting doubled over last year, and in wildlife District 9 the arrest rate more than tripled.

"Typically, night deer hunting activity often goes up and down for no apparent reason," said Rhyne. "However, the increase in night deer-hunting arrests in the Piedmont is probably due to the expansion and growth of deer herds in that area. The deer are more plentiful, so poachers are taking advantage of it. The same situation probably applies in District 9 in the far western mountains. Deer were relatively scarce in this area not long ago, but a restoration program conducted by the Wildlife Commission has brought them back."



Jack Dermid

Risky Business: *Deer offer tempting targets to night hunters, and this illegal activity is increasing in some sections of the state. Last year, the Wildlife Commission made a record number of arrests for night deer hunting.*

The use of aircraft is one of the best tools for controlling night deer hunting, and 22 percent of the cases made last year involved the use of Wildlife Commission aircraft.

"We can cover a large area very effectively using aircraft," said Rhyne. "Typically, we set up a detail involving a large area — often a whole portion of a county — where a lot of night deer hunting is going on. A pilot and single observer fly the area. They can literally spot a match being lit on the ground, and have no problem detecting the muzzle blast from a firearm — it's amazing how much you can see from the air at night. They are also able to track the night deer hunter's vehicle. This information is relayed to teams of officers on the ground, and enables us to make a large number of arrests quite efficiently."

"Working a firelighting detail" is considered one of the most hazardous duties for wildlife enforcement officers, and last year 12 cases of resisting arrest or assaulting an officer were made in conjunction with night deer hunting arrests. "The use of aircraft helps minimize this risk, and we also take other steps. All of our officers work in teams on night deer-hunting details, and we get as many officers to the scene of an arrest as quickly as possible. Fortunately, there were no serious assaults or injuries to wildlife officers last year."

Rhyne adds that a concerned public, however, is probably the best tool for controlling wildlife violations. "Many reports of night deer hunting are made through our toll-free Wildlife Watch Hotline," he said. "This is a great help in controlling wildlife violations, and all calls will be kept strictly confidential."

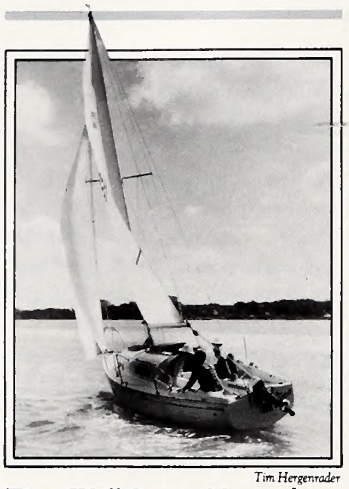
Although night deer-hunting takes place year round, this activity peaks from late summer through mid-winter. Night deer hunting — and other wildlife violations — may be reported through the Wildlife Commission's 24-hour, toll-free Wildlife Watch Hotline at 1-800-662-7137.

Outstanding Officers Honored

Rex Gary Schmidt

Good Show: *The North Carolina Wildlife Federation recently honored an outstanding wildlife enforcement officer in each district of the state at its annual convention. Here, from left to right front, are Ray Taylor, former president of the Federation, Gene Barnes of Gates, Randy Barker of Hamptonville, Doug Flake of Burlington, Paul Linder of Kinston, who was also named outstanding officer for the state, Major Gene Abernethy, and Dr. Jay Hair, executive vice-president of the National Wildlife Federation. In the back, from left to right, are Wayne Rudd of Delco, Travis Whitson of Almond, Walter Cotton of Rich Square, Mark Bruton of Carthage, and Don McGalliard of Newton.*

Safe Boating Week Slated



Tim Hergenrader

Time Well Spent: *National Safe Boating Week will be observed from June 3-9. If you're new to boating, you should sign up for a boating safety course offered by your local Power Squadron, Coast Guard Auxiliary, or other boating organizations. Experienced boaters can also benefit from these courses. Last year over 79,000 young people in the state received instruction in boating safety through a program conducted by the N.C. Wildlife Resources Commission.*

L.A. Dixon Honored

L. A. Dixon of Mebane recently won the 1984 Roger Latham Sportsman's Service award from the National Wild Turkey Federation. Each year, this award honors a nonprofessional for "outstanding contributions to the American wild turkey and its conservation."

In the last decade Dixon has been heavily involved in wildlife conservation. He was a co-founder of the North Carolina Chapter of the National Wild Turkey Federation in 1974, is a past president of the North Carolina Chapter of the National Wild Turkey Federation (the organization was named outstanding state chapter in each of his terms), and serves on the board of directors of both the state chapter and the National Wild Turkey Federation. In addition, Dixon is chairman of the Wildlife Commission's Chairman's Wildlife Advisory Committee.

Calendar Of Events

June 2-3
8th annual Nature Photography Contest at the Marine Resources Center in Atlantic Beach. For more information contact the Atlantic Beach Marine Resources Center, Atlantic Beach, N.C. 28512.

June 4-9
Big Rock Blue Marlin Tournament in Morehead City. For more information contact the Big Rock Blue Marlin Tournament, P.O. Box 1673, Morehead City, N.C. 28557.

June 7-10
North Carolina State Trap Championship in Pinehurst. For more information contact the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

June 8-9
9th Annual WAZZ Great Trent River Raft Race in New Bern. Features raft and canoe races, parade, and other events. For more information contact WAZZ Radio, P.O. Box 2684, New Bern, N.C. 28560.

June 16
North Carolina Blue Crab Derby in Morehead City. Crab races, cooked crab, and other events. For more information contact the Morehead City Kiwanis Club, 4028 Arendell St., Morehead City, N.C. 28557.

June 17-22
Hatteras Sport Fishing School in Hatteras Village. Features instruction and experience in offshore, surf, and sound fishing. For more information contact the N.C. State University Division of Continuing Education, Alice Strickland, P.O. Box 5125, Raleigh, N.C. 27650

June 23-24
Suzy H. Arey Memorial Skeet Shoot in Pinehurst. For more information contact the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

June 29-30
Old Homes Tour of Beaufort. For more information contact the Beaufort Historical Society, Beaufort, N.C. 28616.

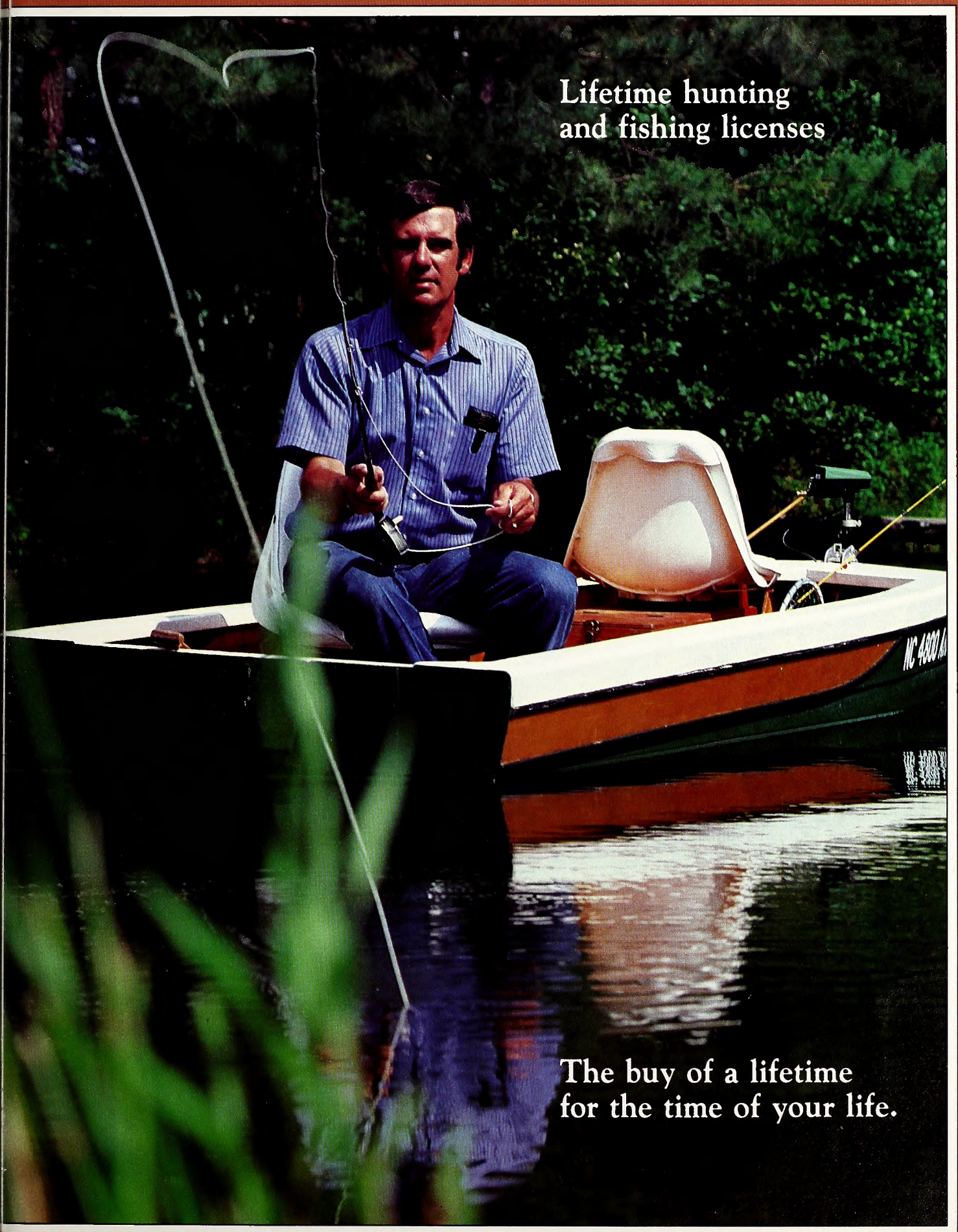
June 30 — July 3
Old Threshers Reunion in Denton. Features wheat threshing, exhibits of antique farm equipment, foods and crafts. For more information contact Brown Loflin, Route 3, Box 240-B, Denton, N.C. 27239.

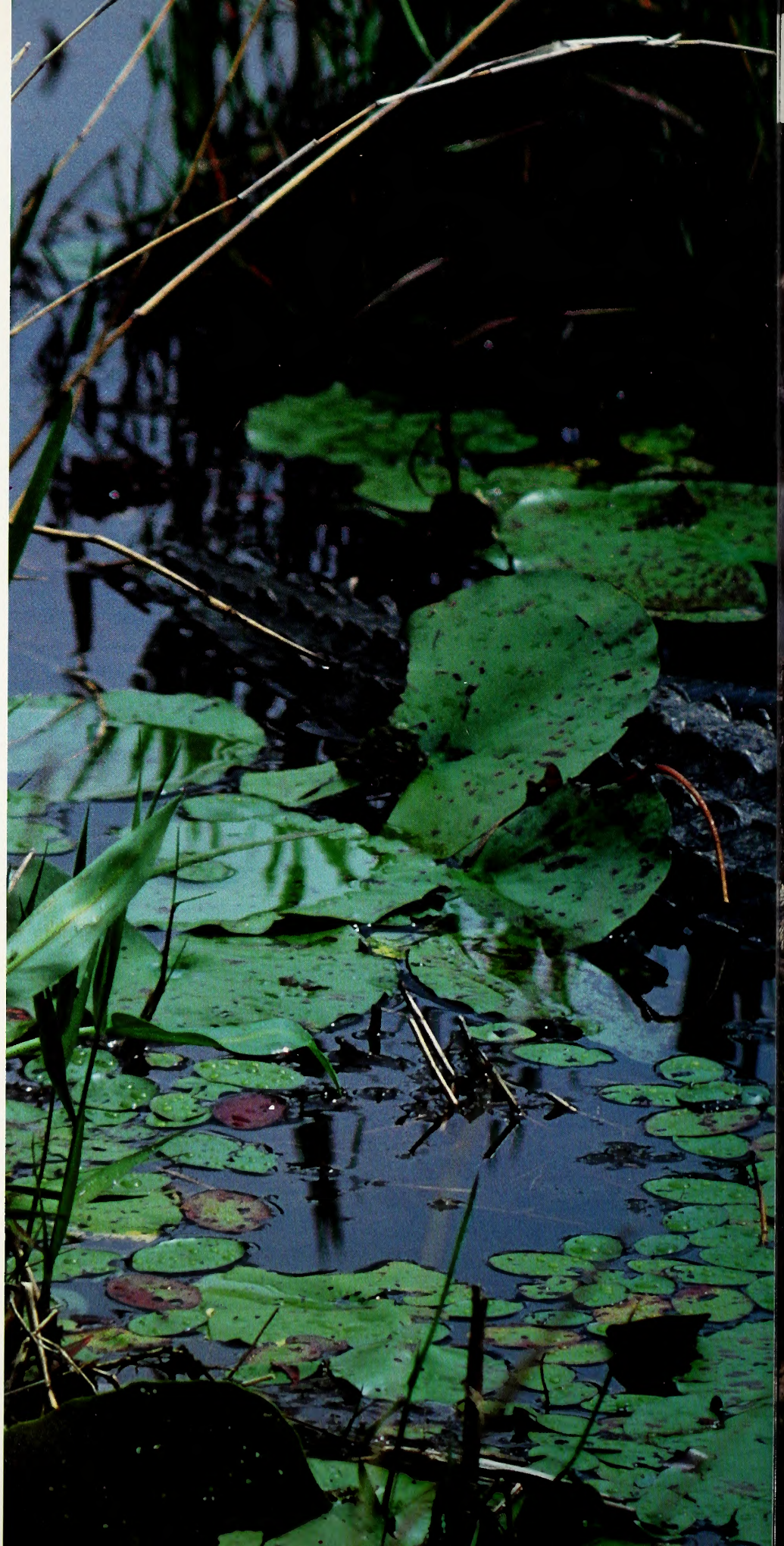
Wildlife Endowment Fund Status Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife in North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 North Salisbury St., Raleigh, N.C. 27611.

Status On February 29, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	7,434	$2,177,367.86
Lifetime Hunting License	930	15,937.32
Lifetime Fishing License	331	54,893.52
Lifetime Subscriptions to Wildlife In N.C.	250	28,041.38
Contributions		34,806.75
	Fund Total	$2,311,046.83


Lifetime hunting
and fishing licenses
The buy of a lifetime
for the time of your life.



Basking Gator

Alligators feed mostly at night, and rest quietly most of the day.

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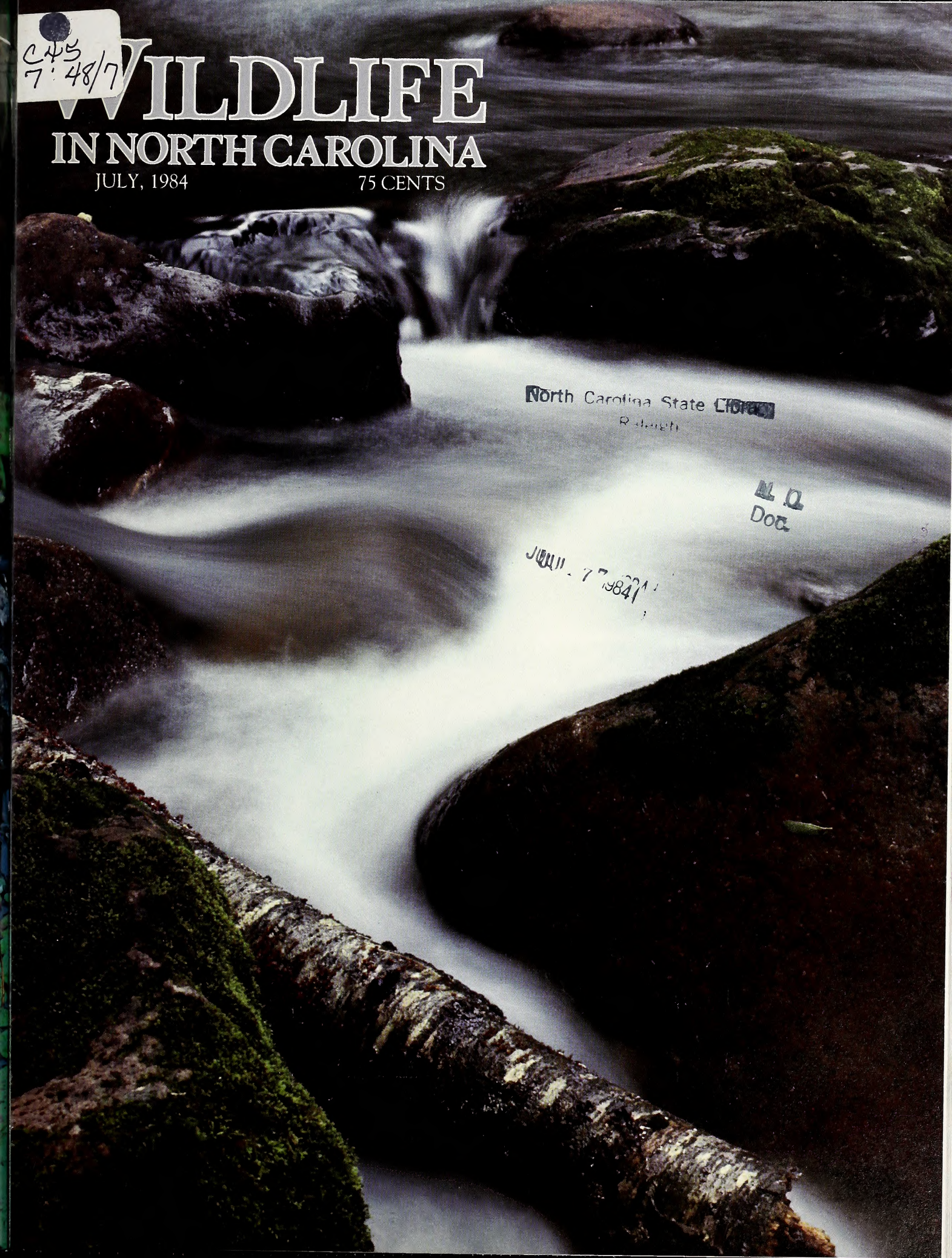
WILDLIFE IN NORTH CAROLINA

JULY, 1984 75 CENTS



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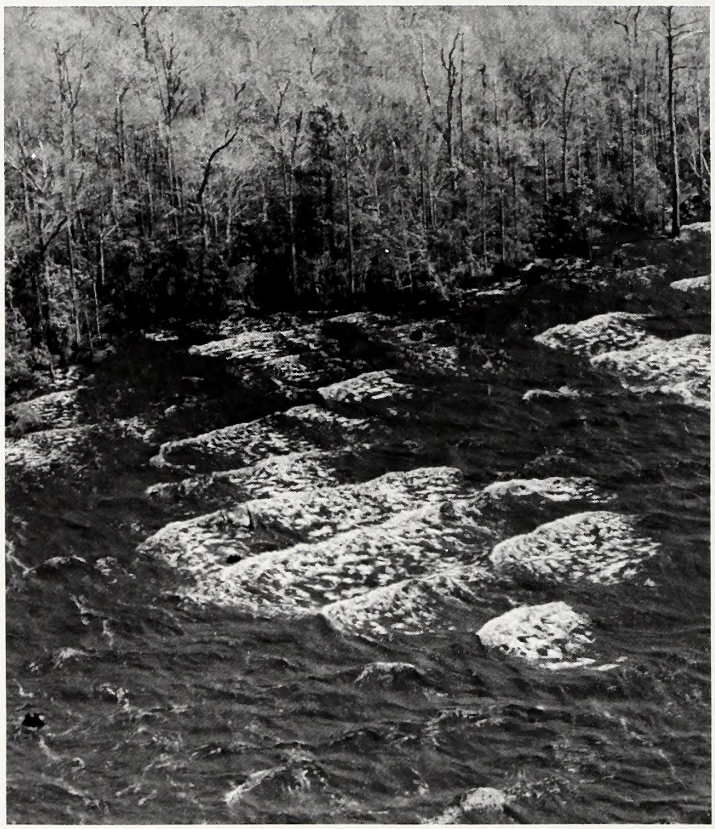
Prudential Giftwraps 120,000 Acres

by Jim Dean

The announcement in the newspapers on March 26 must have evoked a wide range of reactions. Nearly 120,000 acres of near wilderness in Dare and Tyrrell counties — worth perhaps as much as $50 million — had been given to the federal government by the Prudential Insurance Company. As part of the agreement, the land would become the Alligator River National Wildlife Refuge.

It came as a total surprise to most of us. No doubt some lamented the loss of this huge chunk of land for future development. Others, more indifferent, probably thought, "So what, it's only swamp." But sportsmen, conservationists and those who know something about the area collectively breathed a sigh of relief, and gave thanks for the far-sighted efforts of Prudential, The Nature Conservancy and the U.S. Fish and Wildlife Service.



As for me, having watched the massive land-clearing and changes in this part of eastern North Carolina, I confess I had become almost resigned to what seemed to be an inevitable loss of this remnant of our once abundant coastal swamp forests and pocosins. I am glad others did not give up so easily.

What have we gained? I can't speak for you, but I know what it means to me. I thought of a time in the late 1940's when I first fished some of this country with my father and grandfather. One place was called The Frying Pan, a large, remote embayment on the Alligator River in Tyrrell County. Back then, it took all day in a juniper skiff powered by a 4.5 horsepower Martin to get there. At daybreak, we would leave the cabin in the mouth of the Little Alligator and putt south for hours down the western shore of the Big Alligator.

Past towering cypress and a tangled shore, we plowed along, increasingly dwarfed by the wilderness around us. Only the ospreys and eagles marked our passage as we moved relentlessly upstream into the heart of an impenetrable darkness. It was wonderful, and the largemouth bass, pickerel, white perch and panfish in The Frying Pan were merely icing on the cake. We rarely saw another boat in that wilderness, yet even then, I was intrigued by an even more remote region east across the wide Alligator on the mainland of Dare County.

"I don't know that shore, and few people do," my grandfather told me as he pointed across the dark, foam-streaked water. "It's too dangerous to cross the river in this kind of boat. I've heard of a place called Whipping Creek Lake over there and a creek which goes back to some other lakes. Maybe someday you'll get to see them, may even see an alligator."

The idea of exploring that place sent a chill up my back. It still does. Years later, long after my grandfather's death, I fished East and South lakes north of U.S. 64 on the Dare County mainland. For several bleak days in February, two of us trolled for stripers in the lakes and cast for largemouth bass among the gnarled cypress roots along the marshy shoreline. Wild country, to be sure, but I kept thinking of the even wilder land south of 64 where there were places called Whipping Creek, Milltail Creek and Buffalo City.

Buffalo City was settled in 1888 as a logging boom town and you can still drive there and toss a canoe into Milltail Creek. A hundred years ago, it was a wild and lawless place inhabited by immigrants who cut the Atlantic white cedar (called juniper) and cypress and hauled the logs to Buffalo City by rail where they were barged to Norfolk. Rumor has it that somewhere in the swamp there is still an old locomotive rusting away under a tangle of vegetation. Legend also has it that near Whipping Creek, deserters from the Confederate army carved out a settlement in the pocosin.

In that same area, maps made in 1865 and 1863 show a canal from Long Shoal Creek to Whipping Creek which was used to gain access to Alligator River from Pamlico Sound without going into Albemarle Sound.

But the boom towns and railroad are long gone now, and what remains is the nearest thing to wilderness that exists in eastern North Carolina. This area is perhaps the northernmost limit of the alligator's range, and it is surely one of the last eastern strongholds of the black bear. Deer and small game abound. Though logged, there are rare plants and wildlife species here. The saving of this area comes at a time when an estimated 6 million acres of forested wetlands have already been lost to development in the United States. Indeed, someday the Alligator River National Wildlife Refuge may be the last large tract of land like it on the continent.

But for some of us, saving this area is more than a matter of protecting critical wildlife or plant habitat. Prudential has set aside a sense of mystery, a piece of the unknown, and in the years to come that may be the most vital part of this incredible gift.

July, 1984
Volume 48, Number 7

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WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Cover *The fragile beauty of this stream, captured on film by Ken Taylor, could easily be destroyed. Citizens who adopt a favorite stream under the statewide Stream Watch program can help avoid such destruction.*

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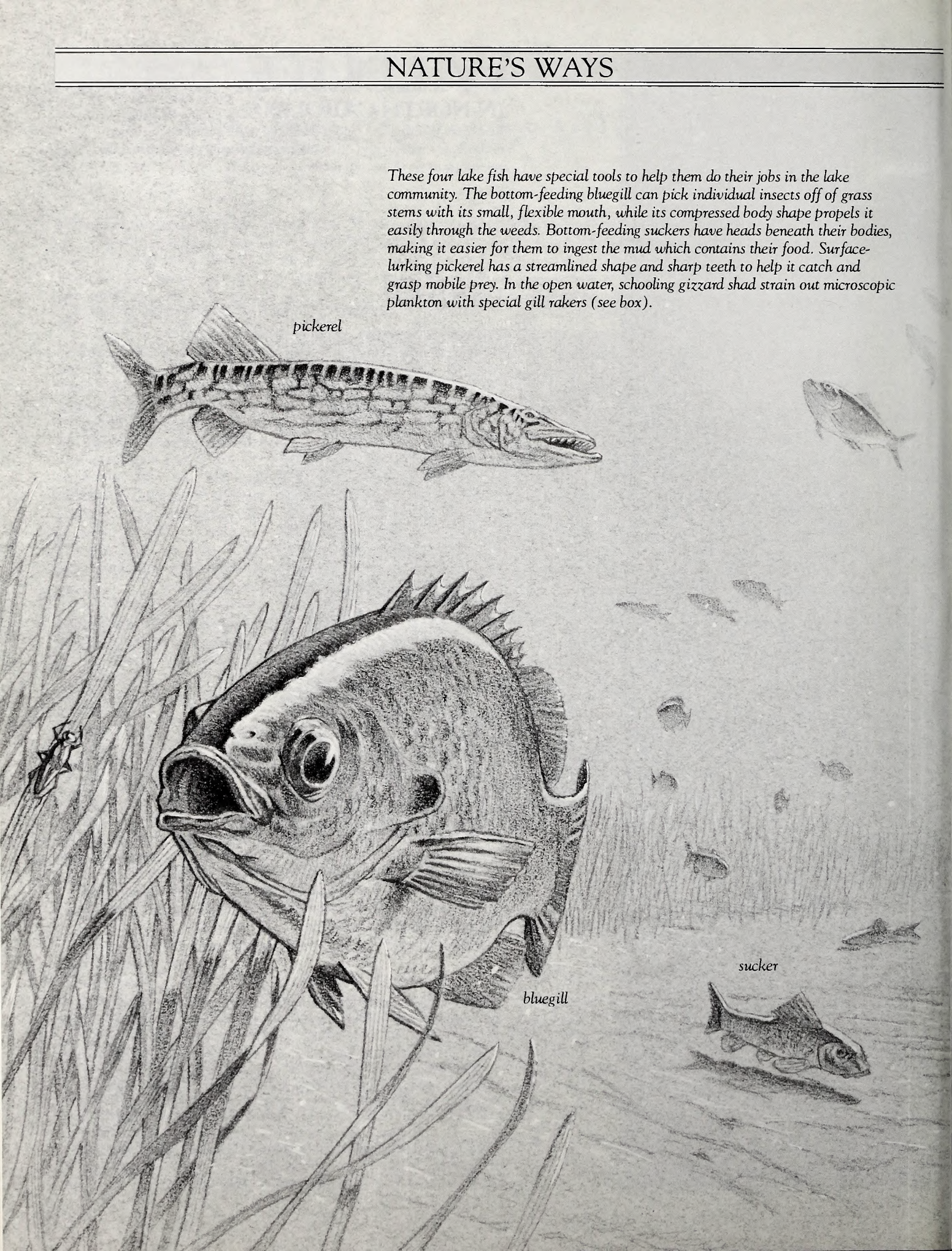
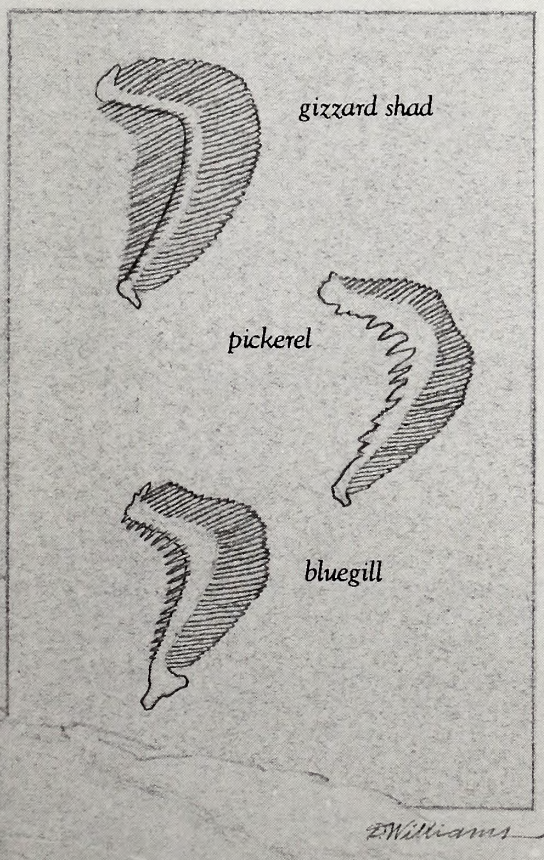
These four lake fish have special tools to help them do their jobs in the lake community. The bottom-feeding bluegill can pick individual insects off of grass stems with its small, flexible mouth, while its compressed body shape propels it easily through the weeds. Bottom-feeding suckers have heads beneath their bodies, making it easier for them to ingest the mud which contains their food. Surface-lurking pickerel has a streamlined shape and sharp teeth to help it catch and grasp mobile prey. In the open water, schooling gizzard shad strain out microscopic plankton with special gill rakers (see box).



Tools Of The Trade

written by Lawrence S. Earley/illustrated by David Williams

Comb-like gill rakers help prevent food from escaping through a fish's gills, but they differ in size depending on what the fish eats. The short gill rakers of a predator such as the pickerel reflect its diet of large fish, while the fine and closely spaced gill rakers of a gizzard shad can strain tiny plankton out of the water. The bluegill's insect diet is larger than plankton and so its gill rakers are shorter than the shad's, though not as short as a pickerel's.



Fish never have to roll up their sleeves when they go to work, which is one advantage to being a fish. But just because they don't wear hard hats doesn't mean they don't work as hard as any of us to make a living.

Take the four lake species in the illustration. The *pickerel's* job is to wait in the weed beds at the lake surface and eat anything that moves. The *bluegill* puts in its hours in the shallower parts of the lake, nibbling aquatic insects off the grass stems or picking them from the bottom. The *gizzard shad* works in the open water among a large school of its own kind, pumping water through its mouth and filtering out plankton. The *sucker* labors at the lake bottom, sucking up mud and sand to extract its vegetable and animal food.

To do their jobs well, each of these four fish — indeed, every fish — comes equipped with some powerful tools. Their mouths, teeth, stomachs, body shapes and other characteristics have all developed in different ways over the eons to enable each fish to hold down its job in the lake community — and to do that job well.

Look at the pickerel's mouth, for example. Long and narrow and studded with many sharp and pointed teeth, it is a handy tool for a predator that ambushes swiftly moving fish. The teeth can hold the prey until it is turned around for swallowing. The sucker, on the other hand, has no jaw teeth at all. To eat organisms in the mud bottom, it has developed very mobile and fleshy lips. Moreoever, its mouth is on the underside of its head so that it can feed on the bottom while keeping its body level. The bluegill has a very flexible, small mouth which protrudes to form a tube that is able to pull in very small food items such as midge larvae from plant stems or mud bottom. The bluegill, gizzard shad and the sucker all have primitive teeth located on their gill arches — these help break down food particles before they enter the stomach.

Another tool which comes in different packages is body shape. The pickerel's streamlined form is good for lunging and for moving in a straight line, but not for quick turns. Quite the opposite is the bluegill's compressed shape which makes it highly maneuverable, able to tip and pick and to evade lunging pickerel and other predators.

The pickerel has an elongated stomach, a shape that enables it to swallow fish almost its own size. The bluegill has a smaller, sac-shaped stomach that is capable of being distended while digestive juices help break down the food that it eats. The gizzard shad has developed a stomach that breaks down hard-to-digest food by grinding it with a gizzard-like organ.

Even the size of the intestine differs among these fish, depending on their jobs in the community. The gut of a predator such as the pickerel is shorter than the gut of a sucker because its flesh diet is easier to break down than the mud diet of suckers.

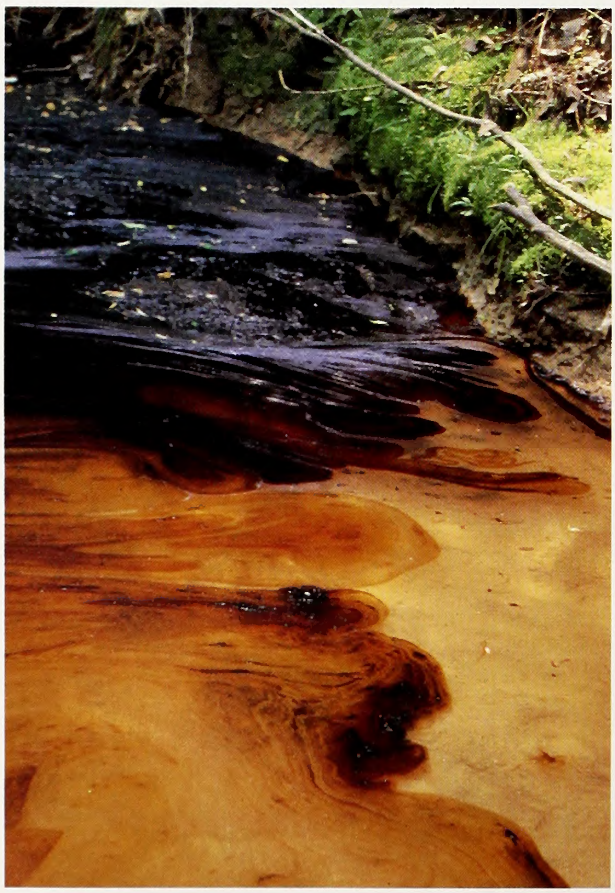
Another interesting tool that enables these fish to do their jobs is the various sizes of their gill rakers. The gill rakers are projections growing along the inner edges of the gill arches that help prevent food from escaping as it is drawn into the mouth along with water. In a predator species such as the pickerel, the gill rakers are short and stubby because the food is larger. In a plankton-eater such as the gizzard shad they are longer, finer and more numerous, functioning like a sieve to strain out the microscopic plankton. In between these sizes are the bluegill's gill rakers. The prey of this fish is slightly larger than that of the shad, but smaller than that of the pickerel.

These tools, or adaptations, combine to enable each fish to exploit the food resources in the lake in a very efficient way. Nature doesn't guarantee a job for every fish in the lake, but she comes pretty close. ⊠

Adopt A Stream

One way to protect a favorite stream or river is to adopt it. That's what Stream Watch is all about.

by Mark Taylor



Jane Rohling

Early detection can often correct a pollution problem before extensive damage is done, and people who use the water for recreation are often the first to discover pollution. Several pollution problems have been discovered and ultimately corrected through Stream Watch volunteers.

The Reddies River is running high and boiling red after two days of heavy winter rains. Below a dam and an abandoned hydroelectric station in the heart of North Wilkesboro, Larry Sloop stands amidst a half-dozen students who occasionally ask questions as they kneel on the bank and collect samples of river water in test tubes and jars.

Sloop was not working with college students as you might expect. The kids who were testing the Reddies River for acidity, dissolved oxygen, and "turbidity" or silt levels last February were seventh and eighth grade students at the Fairplains Elementary School in North Wilkesboro. Sloop and his science classes have "adopted" the Reddies River as a "Stream Watch" project, a program which is conducted by the Division of Environmental Management of the North Carolina Department of Natural Resources and Community Development. Stream Watch is designed to improve water quality throughout the state by increasing public awareness of the need for clean water, and involving citizens in the protection of our streams.

"I first learned about Stream Watch through an article in our local newspaper, and thought it would make a good class project," said Sloop. "Several of my students live along the Reddies River, so we adopted it as a Stream Watch project. The first step was to determine the water quality of the river. For six months, some 20 students took water samples weekly from five locations on the river. We brought these samples back to the classroom, and ran about 10 different water quality tests. The students were so enthusiastic about this project that they ran the tests after school, and even volunteered to work on the project through the summer under my supervision. After we had completed the monitoring, the students compiled the results into a final report."

Sloop is sold on the educational values of Stream Watch. "The kids have learned about biology and sciences, and have applied this knowledge in a practical way. Many of them are avid fishermen, and know that their work on the Reddies River is important. I'd like to see Stream Watch used widely as an educational tool in schools throughout the state — almost every school is within walking distance of a stream, river or lake. Although the water quality testing we did on the Reddies River was quite comprehensive, all of these tests can be done easily and cheaply in the classroom."

Larry Sloop and his class are but one of 65 groups that have adopted North Carolina waterways through Stream Watch. Others include environmental organizations, homeowners groups, and sportsman's clubs. Many of these groups received "mini-grants" of up to $1,000 apiece to fund Stream Watch projects that were reviewed and approved by the Division of Environmental Management. These mini-grants were obtained from a $30,000 grant from the Z. Smith Reynolds Foundation that established the Stream Watch program last year.

"A variety of projects have been undertaken by Stream Watch groups," said Meg Kerr, Stream Watch coordinator for the Division of Environmental Management. "Basically, all of these projects are designed to increase citizen awareness of the need for clean water, and to involve the public in activities that will protect our streams. By building a constituency for a waterway — as the Eno River Association did in Durham for the Eno River — we hope to involve citizens in local land-use processes that affect water quality. Also, many reports of water-quality violations come from citizens who use our waterways for recreation, and this ultimately results in better compliance with siltation and water-quality regulations."

Kerr adds that there are many ways to build public awareness.

Jane Rohling

River cleanups (right) are popular Stream Watch projects, especially in urban areas. The Capital Group of the Sierra Club in Raleigh pulled several dump-truck loads of old tires from a small portion of Crabtree Creek last spring as part of its urban Stream Watch program. The educational values of Stream Watch could be widely applied in public schools. Under the leadership of science teacher Larry Sloop (below), the Fairplains Elementary school in North Wilkesboro has adopted the Reddies River as a Stream Watch project, and science classes have done a comprehensive study of the river's water quality.

Randy Heaton

Mark Taylor

"Some Stream Watch projects are purely educational. The Double Island Community Youth Club in Green Mountain, for example, is developing an oral history of Dobag Creek. High school students in the club have taped and published interviews with old-timers along the creek as part of a *Foxfire*-type project. This has been very popular, and has increased people's awareness of their heritage as well as their appreciation for Dobag Creek. Another educational project is being undertaken by the Swannanoa Stream Watch group in Swannanoa, which is associated with Warren Wilson College. This group is developing a Stream Watch curriculum for schools that could be used from kindergarten through grade 12. Other educational projects include construction of nature trails, slide shows and brochures, and stream hikes. These are especially popular with urban Stream Watch groups.

"In urban areas, educational programs are often the most effective way to fight pollution. Much of the pollution in urban streams is from non-point sources — siltation from construction sites is an especially big problem. Since many different sources contribute to nonpoint-source pollution, making citizens and local government agencies aware of problems often results in better land-use planning that will protect water quality."

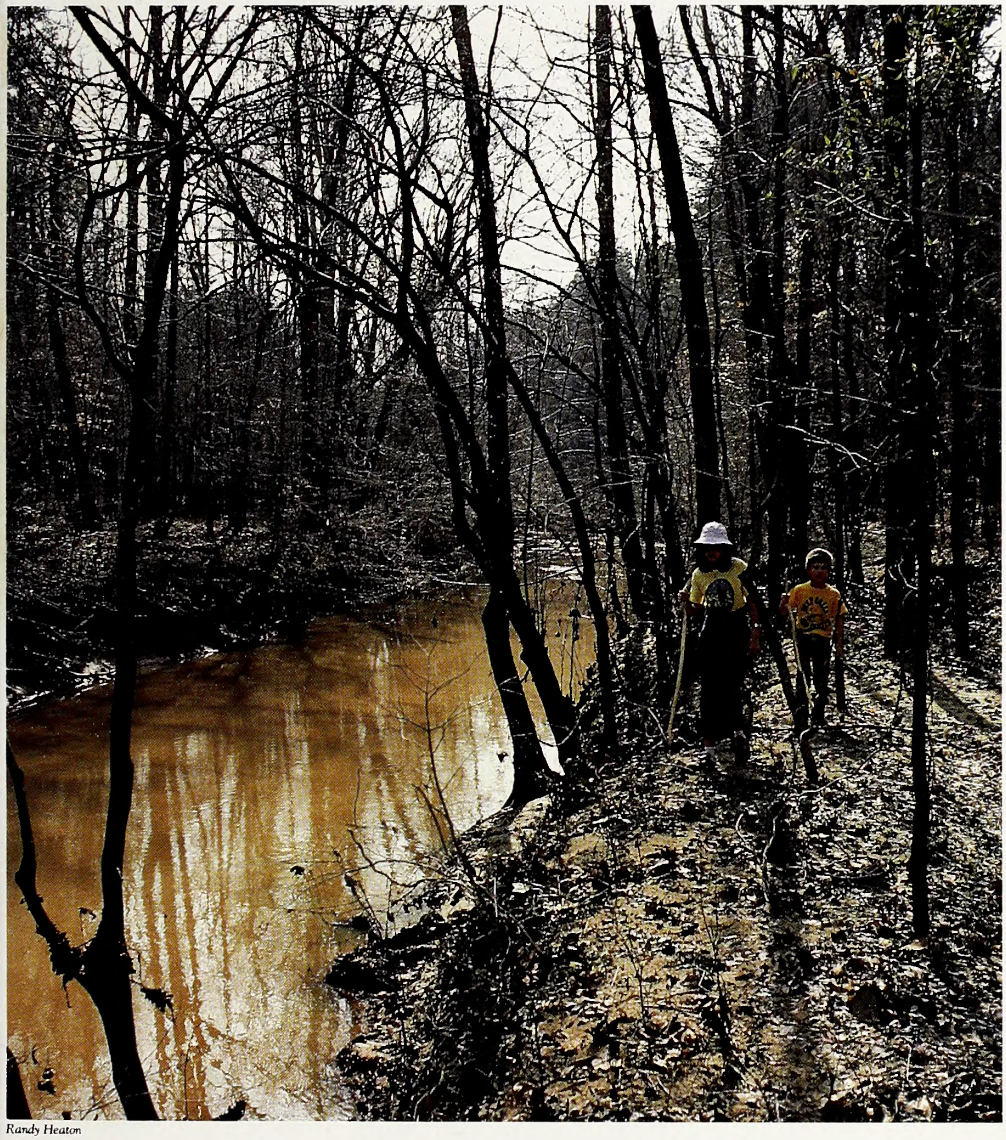
The Capital Group of the Sierra Club in Raleigh offers a good example of the work that can be done through an urban Stream Watch program. The group adopted Crabtree Creek, a heavily urbanized waterway that has its headwaters in the Research Triangle Park and flows through shopping malls, industrial districts, and residential neighborhoods in Raleigh before emptying into the Neuse River. Educational projects undertaken by the Sierra Club included production of a brochure and slide show featuring water-quality problems of Crabtree Creek, construction of a nature trail along the creek, a workshop on water quality and Stream Watch for Sierra Club members in the Triangle area, and recreational stream walks for the general public. The group has also conducted river cleanups, and regularly patrols the creek for pollution and siltation problems.

"By educating the public to the importance of Crabtree Creek, we hope to influence planning decisions that affect the future of the waterway," said Gus Anderson, president of the group. "For example, we've shown the slide show to civic groups in the area, and the brochure has been widely distributed. The river cleanups and stream walks have also helped build an active constituency for the creek. Finally, we've inventoried the creek and divided it into sections. Teams of Sierra Club members monitor these sections frequently to check for pollution and siltation problems."

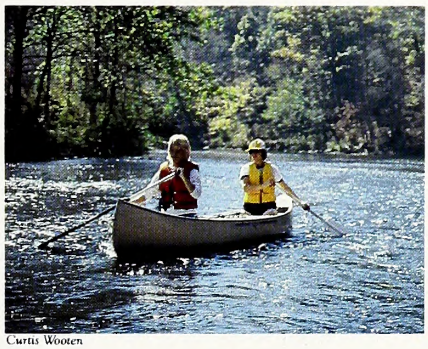
Some Stream Watch groups focus primarily on water quality monitoring. The Arrowhead Property Owners Association of Tyner adopted the Chowan River, and monitors algal levels. This information is forwarded to the regional Division of Environmental Management office in Washington, and is used to develop a regular "algal index" which determines the probability of an algal bloom occurring on the Chowan.

"Members of the Arrowhead Property Owners Association have done an excellent job with the algal index," said Kerr. "This has saved the state considerable staff time, and has made the public more aware of the algal problem. In addition, this group was also responsible for cleaning up a stream. Members found a hog farm that was polluting a creek that feeds the Chowan river, and reported the case to our regional office. The situation has been corrected."

Other Stream Watch groups focus on habitat improvement. The Tuckaseigee Chapter of Trout Unlimited in Cullowhee, for example, adopted Cullowhee Creek and is improving trout habitat in a portion of the creek that borders Western Carolina University.



Randy Heaton



Curtis Wooten

Stream Watch hikes serve a dual purpose — people learn to appreciate our waters, and problems with siltation and pollution are often discovered. This hike (left) is taking place on Crabtree Creek not far from the heart of Raleigh. Canoe trips (above) are another popular Stream Watch activity, and an oil spill on one creek was discovered and reported by several Stream Watch volunteers on a Sierra Club outing.

"This section of Cullowhee Creek was channelized years ago, and has also received heavy silt loads from road construction and rapid residential development in the past decade," said Jerry West, president of the chapter. "Consequently, the trout habitat is very poor. In 1981 we constructed an artificial waterfall in the channelized portion to create additional cover for trout, and it worked very well. As part of our Stream Watch project we plan to build additional structures to provide trout cover, construct a gauge to measure stream flow, and monitor the acidity of the stream. The Stream Watch project has been very popular with our members, and is a program that many fishermen and sportsmen should be involved in."

What does the future hold for Stream Watch? It is hoped that the program will continue to grow despite a loss of funding. "The grant from the Z. Smith Reynolds Foundation was a one-shot deal to get the program established," said Kerr. "We never planned to have this as an ongoing funded program, but we hope that Stream Watch groups will continue their projects, and that new groups will adopt streams. There are many ways that these groups can raise funds for Stream Watch projects. The sale of T-shirts, bumper stickers, solicitation from individuals and businesses, and Stream Watch runs and canoe races are all being used to support group projects."

Kerr adds that Stream Watch is filling a real need in state government. "Staff and funds for water-quality monitoring are stretched thin, and Stream Watch groups have been a big help. We hope that this will continue in the future. In fact, we recently completed a guide book to the 'benthos' or aquatic life in a stream that can aid in this effort. By monitoring the benthos in a stream, a group can determine the quality of the water. Put simply, if a stream has healthy and diverse populations of aquatic life, water quality is usually high. If only one or two species of benthos are present — and populations are low — water quality is poor. We plan to conduct workshops on benthos for Stream Watch groups in the future, and hope to involve these groups in benthos surveys. This information will help us pinpoint water-quality problems in the state."

Is Stream Watch doing its job? Perhaps the best answer came from Timmy Byrd of North Wilkesboro, one of Larry Sloop's eighth graders who was testing for turbidity in the Reddies River.

"I've learned a lot from Stream Watch," he said as he took a water sample. "What has bothered me most is that our rivers are being polluted. If we don't do something about it fast there soon won't be any more rivers to pollute." ⊠

Information on Stream Watch is available from the N.C. Division of Environmental Management, Stream Watch Coordinator, P.O. Box 27687, Raleigh, N.C. 27611.

Merchant's Mill Pond / *Jerome Kohl*

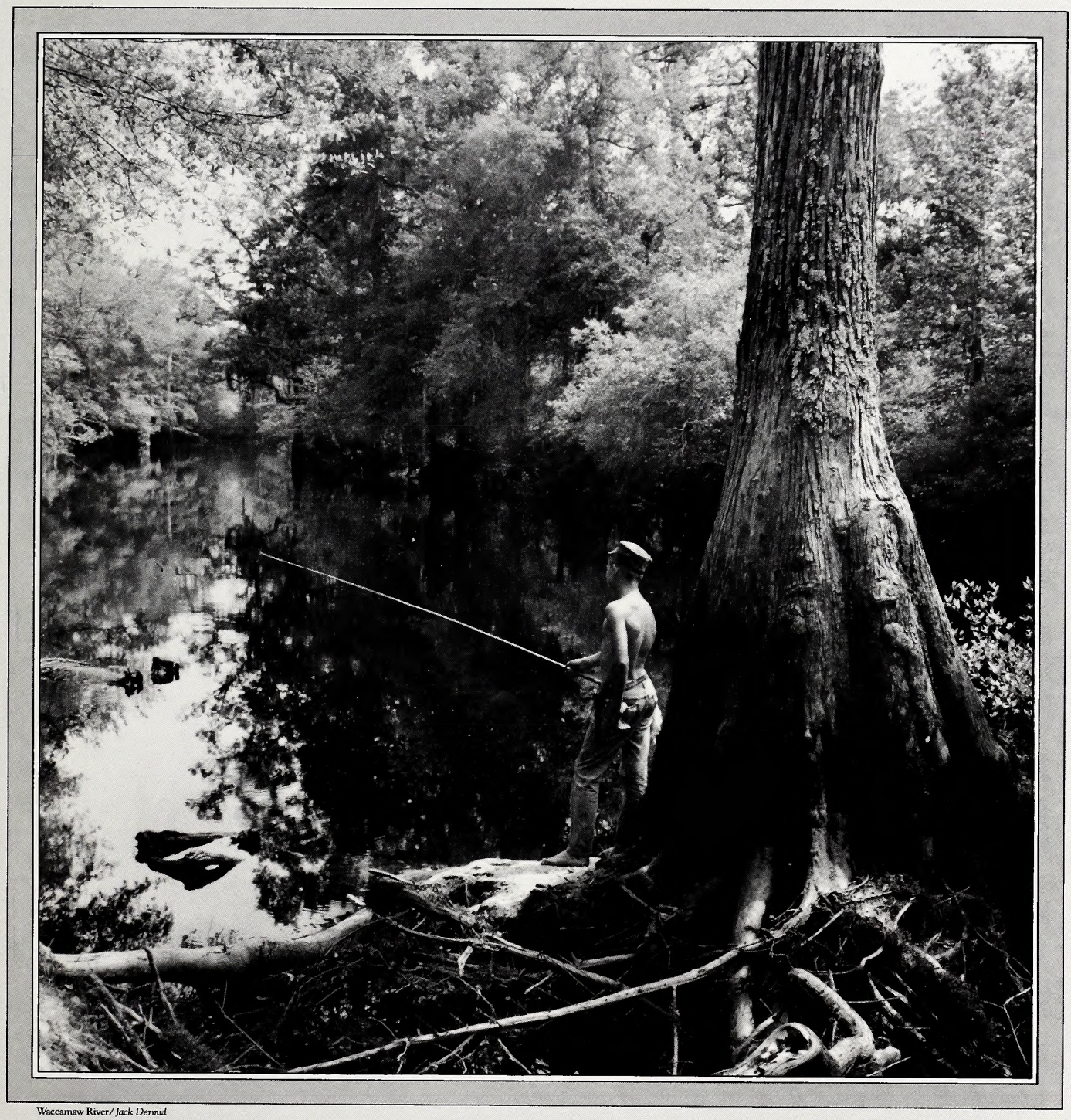
Blackwater Portfolio

The dark waters of the streams and rivers of the Coastal Plain reflect a remote and often unchanged beauty.

by Jim Dean

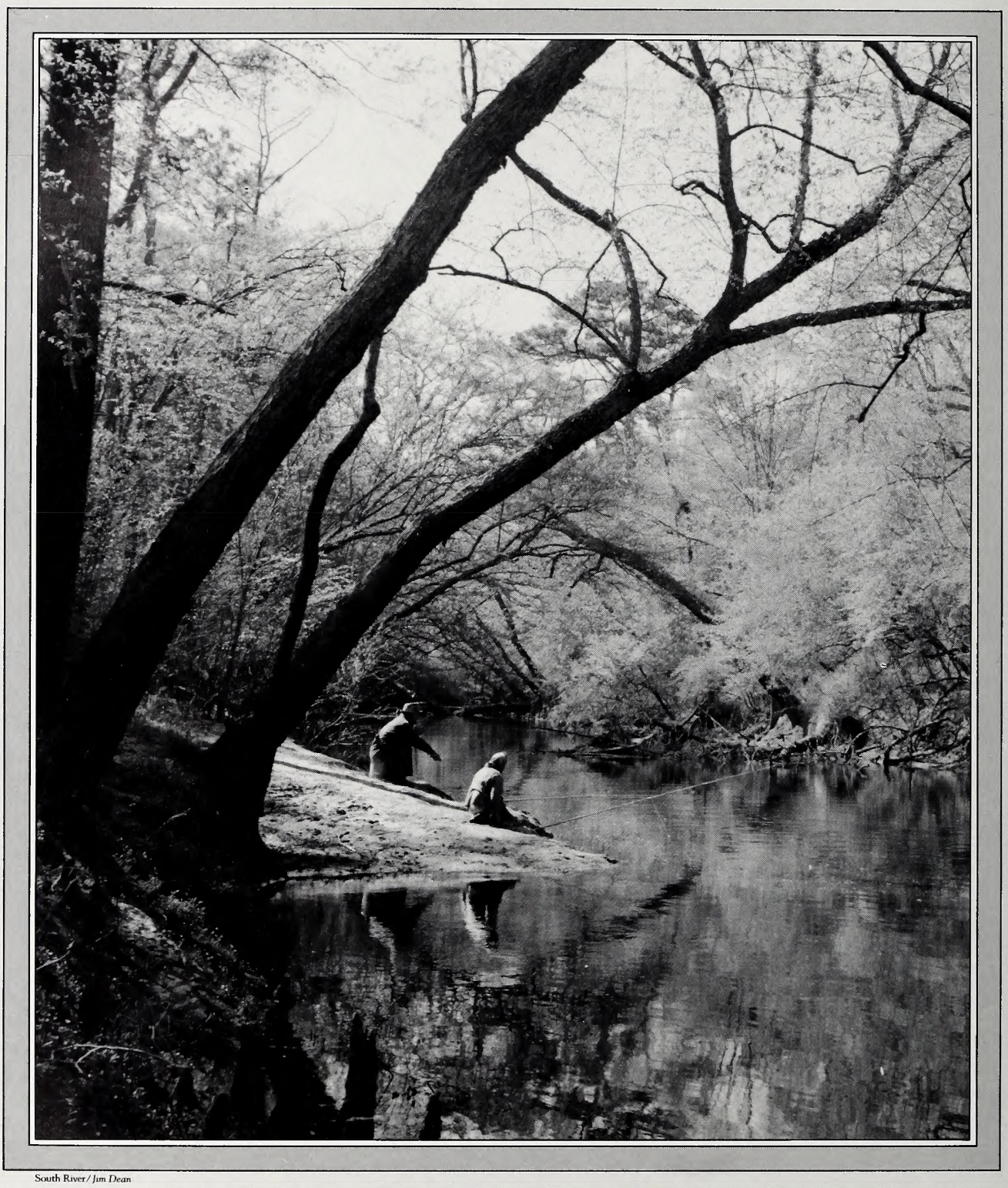
The traditional romantic yearns for days long past; the essential conservative resists change. There are also those who seek simply to escape the quicker pace of life and spend a day midst natural beauty. For all who fit any of these niches, the streams, rivers and swamps of the Coastal Plain have a predictable appeal.

The dark, tea-colored waters often flow away from the crush of civilization, and one can drift or fish lazily and conjure bits of seductive fantasy — that you are truly alone, that it is again 1950 or 1850, that the world beyond the towering cypress does not exist. Of course, there may come a time when these dark waters will become increasingly rare, their remoteness breached by roads, industry and development. Such change is already occurring. Yet many who have seen this blackwater world as it still exists and felt its timeless attraction would not care to live in a world where such places no longer exist. To those who agree, we dedicate this portfolio.



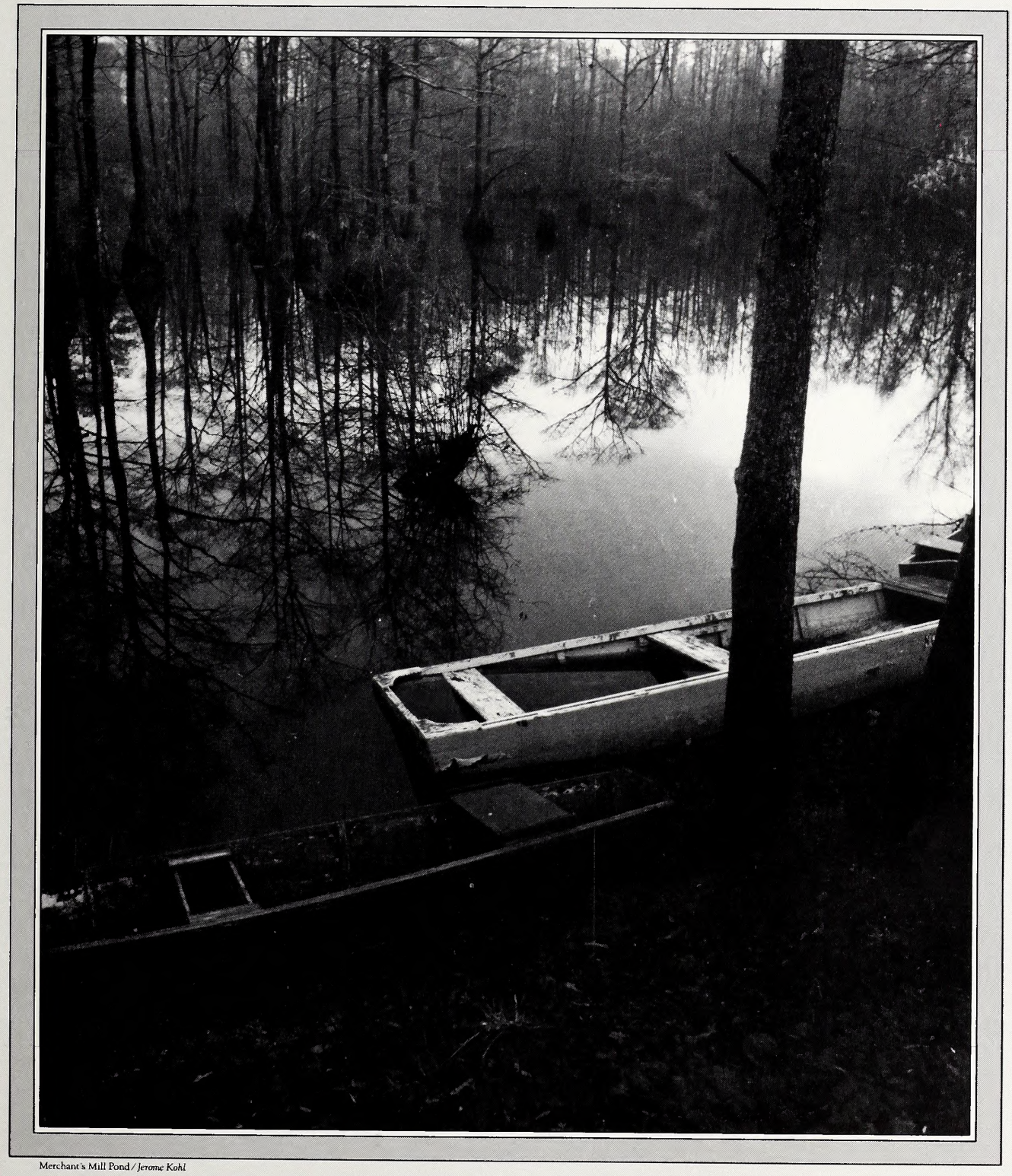
Waccamaw River/ *Jack Dermid*

It's become a cliche—the barefoot, shirtless boy with a cane pole—and yet such scenes are still pleasantly common along the blackwater rivers where a light cane pole rigged with a small cork and baited with a cricket is still the choice if you want a mess of robin (redbreast sunfish). And in defense of cliches, how much charm would this picture hold for you if the boy were dressed in a jump suit covered with patches, and fishing with a graphite or boron rod?



South River / *Jim Dean*

What thoughts pass through a person's mind on a bright spring morning when the new buds are out and sunlight dapples the dark water? Is it important to get a bite, to catch a fish, or is this simply renewal, a moment as primitive as a turtle's need to bask on a log?



Merchant's Mill Pond / *Jerome Kohl*

In the forgotten backwaters of the east there are many moods, and on a dreary day there is haunting beauty in these half-sunken boats. Yet, one can also imagine brighter days when laughter was in the air and the scrape of bailing tins mingled with the chirp of crickets, and as the fishermen paddled into the cypress, the scent of church picnic hotdogs lingered on the summer air.

Big Swamp / *Jack Dermid*

In the fullness of summer, a distant curve in a blackwater river beckons the paddler who knows that once he has rounded that bend he will be wonderfully alone, but not lonely. Of course, there will always be the company of yellow flies and mosquitos, but even they will not spoil this afternoon — as long as the repellent holds out.

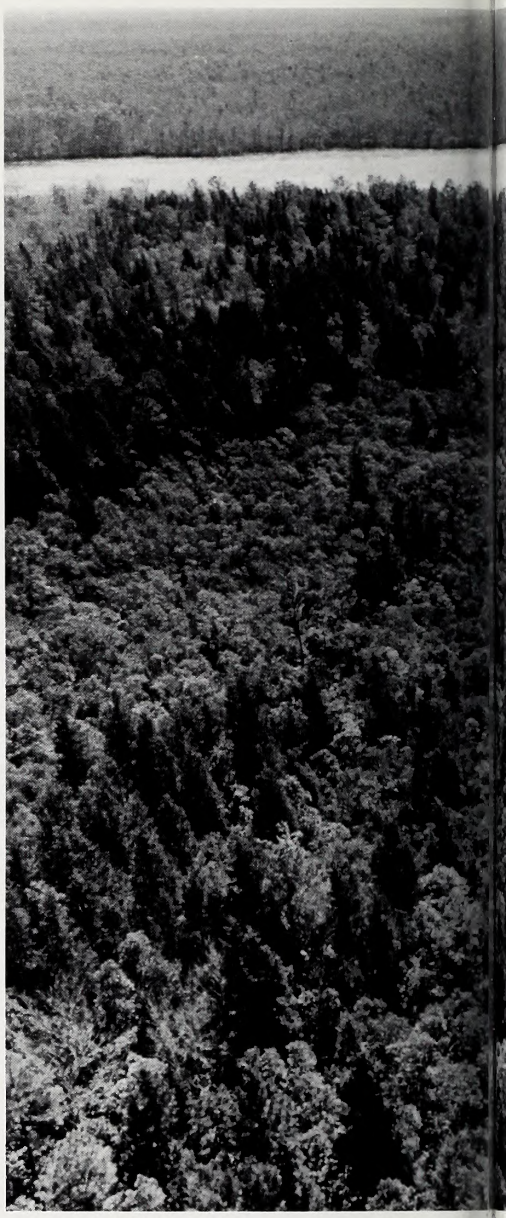
Neuse River/ *Jack Dermid*

In the lower reaches of black water, the river seeker finds even greater diversity where the currents stained by tannic acid mingle with the brackish tides. An inquisitive soul could study 10 square feet of this watery world and never learn half of what there is to know here.

When Prudential Insurance Company gave the U.S. Fish and Wildlife Service 120,000 acres of near wilderness in Dare and Tyrrell counties in March, the future suddenly seemed brighter for many wildlife species and their threatened coastal habitat.

A PIECE OF THE WILD

Irene Vandermolen



by William deBuys

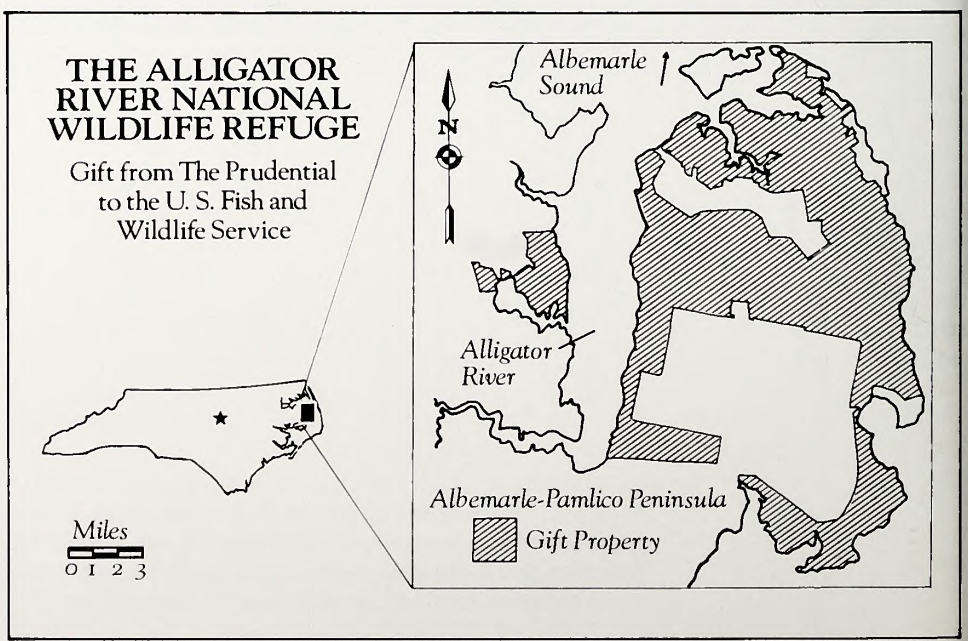
Editor's Note: *William deBuys is director of the North Carolina Nature Conservancy, a major force in finding ways to save critical habitat in the state. The Conservancy is has already assisted in saving many valuable wild areas in North Carolina, among them Bluff Mountain, Nags Head Woods, Merchant's Mill Pond and portions of Green Swamp.*

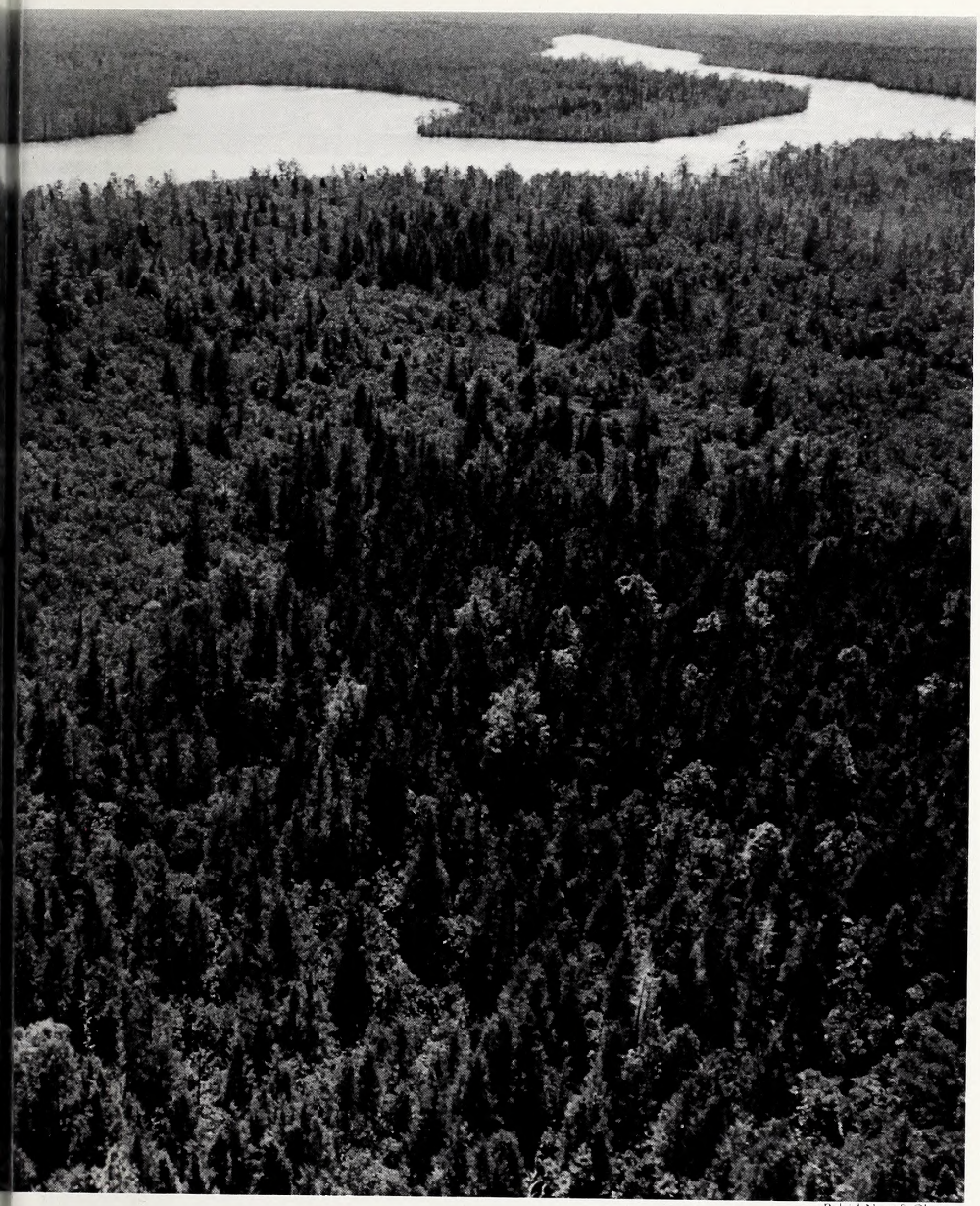
Recently, the Conservancy announced the successful completion of efforts to assist The Prudential Insurance Company in the donation to the U. S. Fish and Wildlife Service of nearly 120,000 acres of near wilderness in Dare and Tyrrell counties. This land will become the Alligator River National Wildlife Refuge.

Wildlife in North Carolina *asked deBuys to write of the Conservancy's long involvement with this project, and what this gift will mean now—and in the future—to all North Carolinians.*

The recent donation of land by The Prudential Insurance Company to the Fish and Wildlife Service culminated many months of intensive effort by The Nature Conservancy's North Carolina and national staffs, and throughout the long period of negotiation and preparation, the most strangely difficult task I faced was to convince people how hugely important the proposed gift really was.

To say that it totaled nearly 120,000 acres had little impact—such a large, round number seemed an abstraction. It was only a slight improvement to say that the gift was two and a half times the size of the District of Columbia, or half again as large as the nation of Grenada. Surprisingly, visits to the property did not always clarify things since one can see only a small fraction of it in a day's time. Even from the air, the true extent of the property was difficult to appreciate. And from a moderate altitude at one end of





Raleigh News & Observer

the property the land stretches away farther than the eye can see.

This gift of land—one of the largest donations in conservation history—should make every North Carolina sportsman and conservationist happy. It contains excellent examples of virtually every major wetland ecosystem found in the Coastal Plain including some of the highest quality swamp forest and marsh land remaining in the state. Not the least important are the many mature stands of Atlantic white cedar and the vast roadless tracts of pocosin within the gift. "Pocosin" is an Indian word meaning "Swamp on a hill" and refers to Coastal Plain bogs dominated by evergreen shrubs and pond pine. Besides providing important wildlife habitat, pocosins serve an important function by filtering and regulating the rate of flow of large amounts of fresh water entering our coastal estuaries.

The gift also includes over 100 miles of shoreline, embracing the full range of salinities found in the Albemarle-Pamlico Sound system, the nation's second largest estuary. These waters are of great importance to both sport and commercial fisheries, as well as to migratory waterfowl.

Three endangered species—red cockaded woodpecker, bald eagle, and the American alligator, which here reaches the northern limit of its range—find their homes within the donated tract. The eastern cougar may also still survive within these dense forests and swamps. Although biologists have yet to confirm the presence of this animal, a number of reliable observers have reported recent sightings. In addition, the Fish and Wildlife Service has named 19 other species found within the donated lands which will warrant "special emphasis." These include the bobcat and the Coastal Plain black bear, both of which have suffered badly from loss of habitat in recent years.

The Conservancy had been in contact with First Colony Farms concerning protection of this important natural area since 1977. In 1980 The Prudential acquired an 80 percent interest in about half of the land that was ultimately donated. The new partnership, called Prulean Farms Joint Venture, laid plans for draining and clearing approximately 23,000 acres of swamp forest for grain production.

Regulatory delays and other problems, however, caused Prulean Farms to scale back its development plans. By the summer of 1983 The Prudential, First Colony Farms, and The Nature Conservancy had entered into intensive discussions concerning the donation of nearly all the undeveloped land remaining in corporate ownership on the Dare County mainland as well as 8,000 acres of undeveloped land in Tyrrell County on the west bank of the Alligator River. Approximately half of the land that was ultimately donated remained in the ownership of First Colony Farm until shortly before the gift was made. As one would expect from an undertaking of this magnitude, the financial arrangements linking First Colony and the Prudential to the Prulean Farms partnership were extremely complex, and it is testimony to the hard work and dedication of the managers of both corporations that the means were found to distribute the costs and benefits of the gift equitably between the two partners.

Together these lands are worth approximately $50 million, making this the most valuable donation of private land for public conservation ever made. It should be emphasized that donation of these lands was by no means the only alternative open to The Prudential and First Colony Farms. Everyone in our state owes a considerable debt of gratitude to the managers of both organizations for having chosen an alternative that will forever add to the quality of life of North Carolinians.

By placing this land in the hands of the U. S. Fish and Wildlife Service, the donors have guaranteed the long term protection of some of the most critical wildlife habitat and most ecologically significant land in the state. Everyone associated with the North Carolina Nature Conservancy is proud to have helped make possible the protection of these valuable wetlands. It was truly a privilege for us to work on a project of such broad scope and lasting significance, and although we may never do another project as large we look forward to reporting in the future on many additional achievements in the conservation of North Carolina's most significant lands.⊠

favorite Bass Lures

There are hundreds of lures to choose from, but you could easily get along with only half a dozen.

by Jim Dean

"When I was a young man, I didn't have much money," an elderly friend once told me. "I could afford only one bass plug at the time. I'd go pick one out and fork over half a day's pay for it. Then I'd tie it on my line and fish with it until it plumb wore out or some bass took it away.

"Naturally, I was pretty careful about what I'd buy," he said. "Sometimes, I'd get a topwater lure with spinners on each end, but most of the time I got a floating-diving plug because it was more versatile. Since I didn't have but one plug, I learned to fish it pretty effectively.

"I don't guess there are any one-plug fishermen out there anymore," he sighed. "Those days are gone forever."

Perhaps they are. After all, there are plenty of bass fishermen who buy darn near everything that hits the tackle store, and they may own hundreds — perhaps several thousand — lures of varying types, sizes and colors. Part of it is a search for the Holy Grail — a lure that will outfish all the others — and part of it is a fear that you will someday be in the midst of a bass-feeding bonanza and not have the only lure they're eating. Some of it is simply the pleasure of buying and owning.

Tournament bass fishing has also sparked a great deal of interest in lures. If a certain crankbait wins a tournament, you can rest assured that every angler who hears about it will buy at least one of them. Of course, in order to fish all these lures, an angler would have to spend most of his time changing plugs. Some of us do just that.

But in fact, it could be that my old friend was at least partly wrong in assuming that the one-plug fisherman has disappeared. That notion still has some currency today, and indeed, most good bass fishermen still cling to a variation of it. For example, you may own hundreds of lures, but chances are you use the same three or four for 90 percent of your fishing. Experienced bass fishermen learn to trust certain lures under certain conditions. I'm no different. I have no idea how many bass lures I own, but I find myself using only a few that I know will frequently produce.

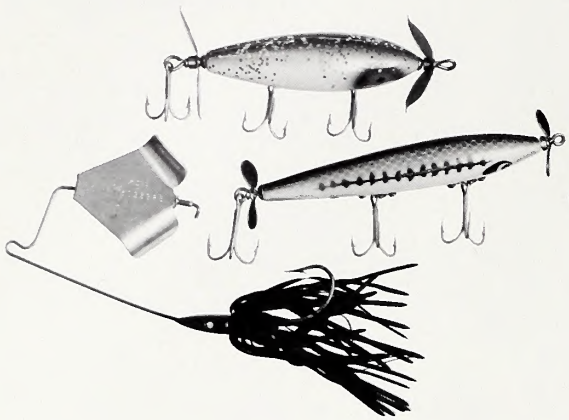
One reason we stick to old favorites may be simply that despite modern technology and all the many new lures that have come on the market, virtually every new lure falls within one of several distinct categories. There are, for example, surface lures, floating-diving lures, subsurface lures that run at a variety of depths and lures that you fish on or near the bottom.

Since most fishermen have a favorite within each of these categories, it's not unreasonable to suggest that we could easily get along with less than half a dozen lures.

If you're a beginning bass fisherman, you may be puzzled by the vast array of lures on the market, and chances are excellent that you'll buy some duds, or at least some unsuited to the waters you plan to fish. With that in mind, let's discuss some admittedly prejudiced favorites. Even if you're already an experienced bass fisherman, you may find these choices interesting — if for no other reason than to disagree. Indeed, I'm absolutely certain I'll leave out not only some of your favorites, but forget to mention some of mine.

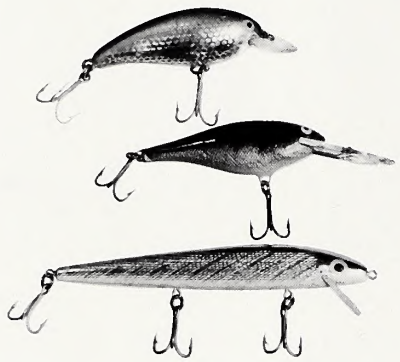
Jim Dean

Surface Lures



One of the most popular surface lures for bass is a twin-spinnered surface plug such as the Smithwick Devil's Horse *(middle) or the* South Bend Nip-I-Diddee *(top). Surface buzzers like this* Lunker Lure *(bottom) are also growing in popularity, but if you must choose only one, a twin-spinner plug would be hard to beat.*

Floating-Diving Lures



Lures that float and dive on the retrieve are among the most versatile of all bass lures. A variety of crankbaits (top) are available, and the hottest of these types currently may be the Rapala Shadrap *(middle). Overall, however, it would be tough to find a better lure than the shallow-diving models like this* Rebel *(bottom).*

Sub-Surface Lures

Spinnerbaits like this double-bladed lure (top) have rapidly gained popularity among bass fishermen because they cast well, can be fished at a variety of depths and are nearly weedless. Smaller types like this Beetle-Spin *(bottom) are also highly effective for bass, as well as panfish. Still, for largemouth bass, no lure has caught more bass — and especially big ones — than plastic worms (middle).*

Surface lures (also called topwater lures). This category is a sentimental favorite since most fishermen, myself included, will admit that they'd prefer to catch a bass on a topwater plug than to catch one on any other type. Yet, oddly, there seems to have been less technical development in topwater lures over the years than with any other type. Also, it seems that lure manufacturers have cut back on the wide variety of surface lures they once offered, and especially the once-popular 5/8ths ounce lure. With few exceptions, throughout the lure trade, these heavier lures (and not just surface lures, either) have increasingly been replaced by lighter lures even though no other size casts as nicely or accurately as the old standard 5/8th. One reason, of course, is the popularity of spinning tackle which can handle lighter lures that may have more lively action. Even the new casting tackle works well with lighter lures, yet the apparent decline of big baits seems premature.

As mentioned, the design of most topwater lures has remained fairly constant, and of these, the spinnered plug may be the best. Others may prefer a popper or chunker like the *Arbogast Hula Popper* or a crawler like the old *Arbogast Jitterbug.* Some will swear by dippers and sliders like the *Heddon Zaragossa;* however, I'm partial to double-spinnered lures like the *Smithwick Devil's Horse,* and I doubt if I'll get much argument from most bass fishermen. If bass are feeding on the surface, this lure will usually catch them, and it's also still available in larger, heavier sizes for conditions when such lures work best.

In recent years, another type of spinnered surface lure has been redesigned, and it is probably the oldest type of all. Before the turn of the century, anglers used long jigger poles to drag spinners on the surface around likely looking spots, and the tactic was — and still is — deadly. One modern version is called the *Lunker Lure,* although several manufacturers make similar lures. It consists basically of a large aluminum propeller mounted on a "safety-pin" shaft with a molded lead weight and a wiggling plastic skirt. Though it's basically a spinner bait, it's designed to run on the surface. It's also nearly weedless, and although it is so noisy you'd think it might frighten fish, it's surprisingly effective. It has rapidly become a favorite of mine.

Floating-diving lures. This category is, in my opinion, one of the most versatile of all bass lure types, and I suppose if I could own but one bass lure, it would be one of these. Since these lures float, they can be manipulated and fished on the surface. Once you begin your retrieve, these lures will dive beneath the surface and wobble enticingly. They're effective with a steady retrieve, and also with an erratic, darting retrieve.

Floating-diving lures were among the first developed at the dawn of plug casting from 1900 to 1910, and many effective types have been made over the intervening years. Yet, whereas some of the early lures are very effective, the best

floating-diving lures were developed more recently. When Laurie Rapala of Norway made the first slender, floating-diving *Rapala* about 20 years ago, he revolutionized this type of lure. The balsa-bodied *Rapala* in all its styles and sizes is a sure winner, and so are its many imitators. Though made of plastic, the near look-alike *Rebel* lures are also excellent, and perhaps more durable. Both manufacturers make small-lipped shallow-diving lures and long-lipped deeper divers, and they're all fish-catching machines.

Another series of floating-diving lures called alphabet lures (because the first one was called the *Big "O"*) have grown in popularity in recent years. You also hear them called fat plugs because of their rounded shape, or crankbaits. Again, some are shallow diving, while others dive much deeper. Of course, there are certainly other good floating-diving lures that catch fish, including some older patterns like the *Bomber, Whopper-Stopper* or *Arbogaster.*

Sub-surface lures. There is probably more variety among sub-surface lures than any other single category. In addition to many types of sinking plugs, there are also spinners like the *Mepps,* spoons like the *Johnson Silver Minnow* and a host of jigs, spinnerbaits and other curious items — some more curious to fishermen than fish, alas.

Sorting through this melange is made more confusing by the fact that your choice should be dictated by the depth of the water you are fishing, or whether you plan to cast or troll. In the interests of simplicity, however, let's assume that you're fishing farm ponds, small lakes or rivers, and when you fish large lakes, you usually fish the shorelines, points and structure at depths no greater than about 15 feet. That covers the kind of plug casting most bass fishermen do in North Carolina, anyway.

So, what should you choose? My own choice would be a spinnerbait. These weighted, safety-pin rigs with a single upturned hook usually feature one or more free-swinging spinner blades and a skirt that consists of a fringe of plastic or rubber strands. On some spinnerbaits, especially the smaller ones, the skirt is replaced by a molded, soft plastic body in various colors.

Spinnerbaits are highly versatile — perhaps even more so than the floating-diving lure. They can be retrieved rapidly so that they buzz the surface like a *Lunker Lure,* or pulled at various depths with a steady retrieve. They can be bounced through rocks and limbs or jigged along the bottom. Being nearly snag-free, you can fish one almost anywhere, and bass love 'em in all sizes and colors. Indeed, there are so many near-alike brands that it would be unfair to name just one.

For casting or heavy spinning tackle, I like the larger spinnerbaits with twin spinners and a fringed skirt. However, the smaller *Beetle-Spins* with molded bodies are absolutely deadly for bass on light spinning tackle, and the smallest *Beetle-Spin* may be the all-time greatest lure for 4-pound ultra-light spinning tackle. It's a killer on small bass, and also panfish.

Bottom-fishing lures. This section is probably mis-titled since you can fish a number of lures on or near the bottom including diving lures and spinnerbaits. However, there is really only one class or lure that really fits this category, and that's the soft plastic worm and its variations. No other development has changed bass fishing as dramatically as the plastic worm. In fact, since its introduction in the late 1950s, the weedless, weighted plastic worm fished on the bottom has probably caught more bass — and more big bass — than all the other lures combined. Like them or not, unless you learn to fish plastic worms you will never be a complete bass fisherman.

As with spinnerbaits, there are too many types of similar worms available to mention brand names. However, I prefer a soft, 9-inch worm rigged on a 5/0 hook behind a sliding pyramid sinker for most bass fishing, and especially when I think there's a good chance to catch a big fish. Big fish like big baits — or so I like to pretend. A 7- or 8-inch worm might be a good compromise, and many fishermen like even shorter worms. Some also successfully fish plastic salamanders and similar molded lures, but I think the worm is a better choice. Incidentally, the worms are made weedless by turning the hook and burying the point into the body of the worm. The old weedless wire guards once used on worms are largely a thing of the past. A worm properly rigged can be bounced through brush or fished along the bottom with a minimum of hangups, and that's often where the bass are.

As for colors, purple — or grape — is one of the most popular colors (and yes, many are even flavored). Black, blue, translucent green and translucent brown are other personal favorites. Some fishermen even swear by the "motor oil" flavor, but I draw the line there. That smell stinks up my tackle box, flavors my lunch and offends my sense of propriety. Let 'em eat grape or black raspberry, I say.

So what does all this mean? Simply this. You can continue to carry a tacklebox crammed full of lures with you on every trip just as I do. You can figure — again as I do — that sooner or later you're going to be darn glad you had that double-jointed bass snagger that never, ever provoked a strike before. You can take pleasure in the gleaming rows of multi-colored lures and feel a perverted sense of wealth — just as I do.

But the truth is that we could carry a *Devil's Horse,* a *Rapala* or *Rebel,* a spinnerbait and a weighted, weedless plastic worm and probably catch as many bass as we do now.

But also, the truth is that I could never do that. Even as I wrote that sentence above, I was thinking of several additions. A big-lipped *Rebel* or deep-diving alphabet lure would be nice. Can't leave out a *Lunker Lure* or *Beetle-Spin,* can I? And what about . . .?

Look, what d'ya say we just forget I ever brought the subject up. ⊠

Traditional Boats of North Carolina

A century or more ago, wooden boats along our coast followed certain time-tested designs, and today's sailors are reviving them.

written and photographed by Mark Taylor

It's a bluebird day as we sail out of Harkers Island in the early morning. Bill Newbold handles the tiller while Hank Murdock — resembling a benevolent, bespectacled Ahab in yellow oilskins — leans against the foredeck and watches for crab pots.

Hampton Mariner's Museum

Deadrise skiffs were widely used for commercial fishing in North Carolina early in this century.

"We'll set a gill net for bluefish off Core Banks, and then go check our crab pots," said Newbold. "It's early, but there might be some blues moving."

We tack across Core Sound and drop 200 yards of gill net perpendicular to Core Banks. In older times the net would have been made of heavy tarred cotton twine, but today a lightweight monofilament net snakes out of a large box mounted on the stern as we run downwind. As the marker buoys pop over the side, Newbold changes course for the eastern tip of Harkers Island and starts a small outboard motor mounted on a side bracket as we drop sail.

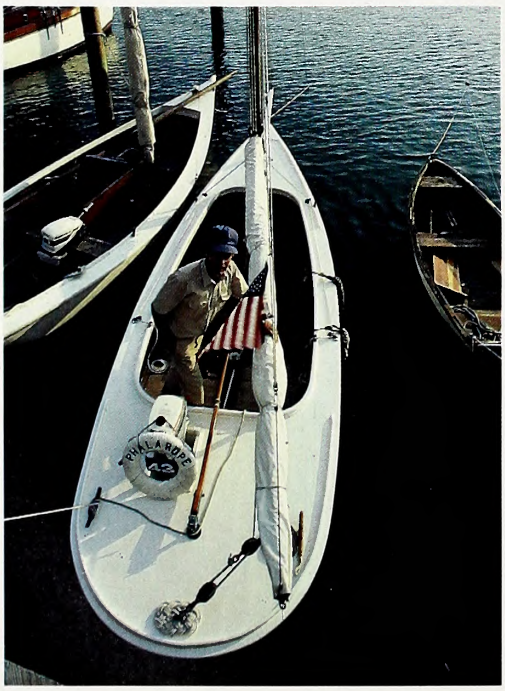
"Normally I wouldn't do this, but the wind is dying and we've got 40 crab pots to check," he hollered. "We usually do everything but run the crab pots under sail."

Bill Newbold and Hank Murdock, both of Harkers Island, are reviving a classic North Carolina tradition — commercial fishing from a sailing sharpie. Both men are retired, and when Newbold moved to Harkers Island six years ago he decided he wanted to try fishing from a sharpie after learning about the area's maritime heritage.

"I've always wanted to fish from a sailboat, so I had Karl Muller of Harkers Island build me this 26-foot sharpie in 1981. Although I've done a lot of commercial fishing, I had never sailed before. I knew Hank Murdock well, though, and he's an excellent sailer. We decided to try fishing together, and found we made an excellent team. One man handles the net or pots while the other sails the sharpie."

The sharpie (right) is a fast sailer and an excellent work boat. Bryan Blake of Gloucester built the 20-foot Tortuga *in 1974 for a couple who wanted a sharpie for pleasure sailing and small-scale commercial fishing.*

Newbold and Murdock are part of a large renaissance in traditional boats. Until recently, most small working sailing craft were neglected by historians and contemporary boatbuilders. Small fishing boats lack the romance of larger vessels, such as clipper ships, or the elegance and speed of yachts and racing boats. Interest in traditional boats has revived, however, and most of what we know about the early boats of North Carolina is due to the work of the Hampton Mariners Museum in Beaufort.



A round stern (above) is characteristic of sharpies, and is the most difficult part of their construction. This 20-foot sharpie was built by Bill Hettler of Morehead City, and named Phalarope *in honor of the shorebird that frequents our marshes and beaches.*

"It's surprising how little we know about the traditional, sail-powered work boats that were used in most areas well into this century," said Michael Alford, Curator of Maritime Research at the museum, who has been studying traditional North Carolina boats for over 20 years. "Most of these boats were fished hard and then discarded, so few original boats remain. Work boats were also generally built by individual fishermen, and the builder usually carried the plans in his head. The men who built and sailed these boats are rapidly disappearing, and when they are gone a fascinating slice of history will die with them."

Alford and the museum staff have developed working plans for several traditional boats through interviews with aging fishermen and boatbuilders, and by measuring and "taking the lines" of the few original boats that remain. Although there were literally dozens of different types of boats used in North Carolina from the 1700s through the early 1900s, three classic sailing craft either evolved in or have strong links to North Carolina coastal waters. These are the sharpie, the shad boat, and the Carolina spritsail skiff.

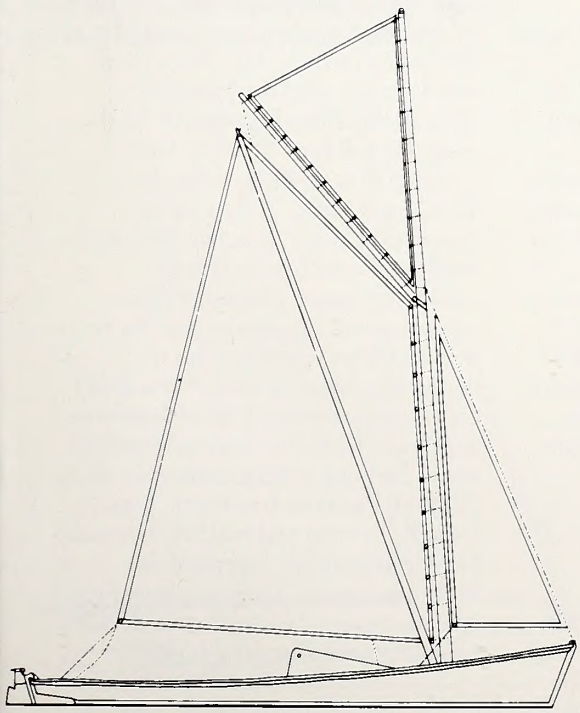
The sharpie from which Bill Newbold fishes would have been a common sight in North Carolina at the turn of the century. Thousands of these boats were used along our coast, but they were most common in the Beaufort and Morehead City areas. North Carolina fishermen prized the sharpie for its seaworthiness, large cargo capacity, and open work area. And best of all, especially in Core and Bogue sounds, the shallow-drafted vessels seemed almost capable of sailing on a heavy dew!

There has probably never been a boat better adapted to the shoal waters of North Carolina than the sharpie. Ironically, the sharpie was not developed in North Carolina, but was introduced to the state from the North.

"A Rhode Islander named George Ives introduced the sharpie to North Carolina in 1875," said Alford. "Sharpies were widely used for oyster tonging and net fishing in Long Island, and Ives felt that these boats were well-suited to North Carolina. He was heavily involved in the seafood and fishing industries in coastal North Carolina, and brought a 34-foot sharpie down to

Smithsonian Institution

On facing page, Ed Beck of Wilmington (left in photo), and Michael Alford of the Hampton Mariners Museum in Beaufort, examine a Carolina spritsail skiff that Beck built for the North Carolina Wooden Boat Show. The shad boat (left) is a direct descendant of the dugout canoes used by coastal Indians. These boats feature a one-piece keel and bottom carved from a single log. Curved slices from the stump were used for the stem and ribs, and a flying topsail enabled the boats to work close to shore and take advantage of breezes coming over the treetops. Shad boat builders used a half-hull model to develop the lines of their boats — a technique not used for skiffs and sharpies. North Carolina builders probably learned this trick from northern boatbuilders who worked in shipyards on the occupied Outer Banks during the Civil War.



shad boat

Beaufort. Local fishermen were skeptical of the seaworthiness and sailing characteristics of Ives' sharpie until it beat the fastest fishing boat in Beaufort in a race in heavy weather. Then, they were quick to adopt the boat as their own. Within five years, there were over 500 sharpies being used in the Beaufort area."

The sharpie is characterized by a plumb or even inverted stem, straight sides, a flat bottom across the beam (there is considerable curve or "rocker" in a sharpie hull fore and aft), and a rounded stern. The boats were usually sailed with a double-masted, leg-of-mutton spritsail rig. This ancient sail plan lacks the low-swinging boom used on most sloops today, but instead features a spar called a "sprit" that extends diagonally across the sail. No standing rigging is needed to support the mast, and the sprit offers plenty of headroom — a feature much appreciated by lone fishermen who hauled nets and handled the boat at the same time.

North Carolina fishermen also found that the sharpie could be built easily and quickly — most fishermen could build one in three to four weeks. Locally available hard pine, oak, cypress, and "juniper" or Atlantic white cedar produced a boat that was inexpensive, solid and exceptionally durable. Sharpies of all sizes were built in North Carolina, but most ranged from 26 to 36 feet. The smaller ones — from 26 to 28 feet — were usually handled by one man and could carry 75 to 100 bushels of oysters. Larger models were usually worked by two men, and could carry 150 to 175 bushels of oysters.

"Changing times also contributed to the popularity of the sharpie," said Alford. "Improved transportation systems in North Carolina created a large market for shellfish and seafood after the Civil War, and the sharpie was a workhorse of a boat that could help meet this demand. The large, open work area offered plenty of room for handling nets or hauling fish, and the

Bill Newbold (in foreground) and Hank Murdock of Harkers Island have found that the sharpie is still an excellent choice for commercial fishing. They fish for crabs, bluefish and shellfish from a 27-foot sharpie built for Newbold in 1981.

Hampton Mariner's Museum

Be Your Own Shipwright

What does it take to build a traditional wooden boat? That depends. Only a master boatbuilder would possess the skills needed to build a shad boat, even if a suitable log could be found for the keel, which is doubtful. Sharpies and skiffs are another story.

The height of the social season for traditional boat builders is the last weekend in September when the annual North Carolina Wooden Boat Show is held in Beaufort. The event is sponsored by the Hampton Mariners Museum, and this year the show will be held on September 29-30. There's no better place to look at traditional boats and talk to boatbuilders.

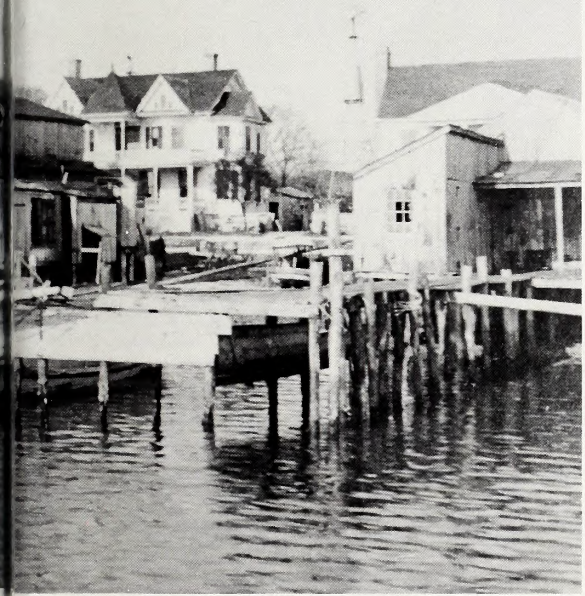
Most of the sharpies and skiffs entered in the show are built from plans obtained from the Hampton Mariners Museum. Some are built by professional boatbuilders such as Karl Muller of Harkers Island and Bryan Blake of Gloucester who are widely known for their fine work. However, most boats are built by amateurs, and many of these feature fine craftsmanship. Ed Beck of Wilmington and Bill Hettler of Morehead City are two of the amateur boatbuilders who entered fine examples of traditional North Carolina boats at last year's show.

"I built my 17-foot spritsail skiff using plans I obtained from the Mariner's Museum," said Beck at the show. "In fact, I finished only last night. It took about a year and a half working part-time on evenings and weekends to build this boat. She sails real well, and I'm very pleased. Building a boat is not simple, however. It's very time consuming, and I had also done quite a bit of woodworking before I started."

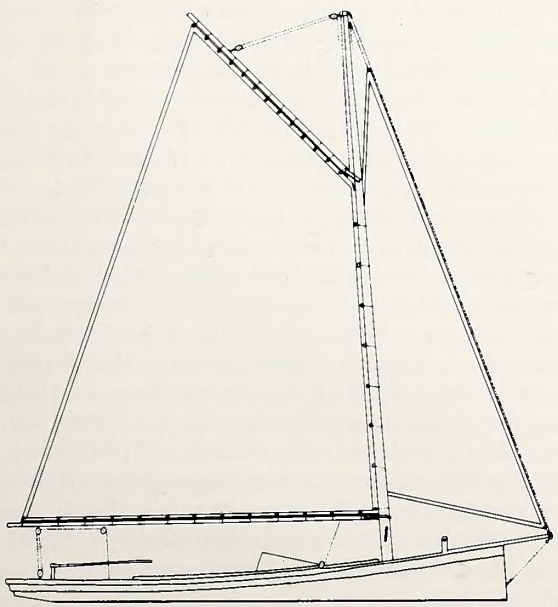
Bill Hettler had three boats entered in the show, and the craftsmanship and fine detail of these boats was superb. Two were traditional North Carolina boats — a 20-foot sharpie called *Phalarope* and a 18-foot deadrise Carolina spritsail skiff called *Willet*. The third was a beautiful lapstrake Whitehall pulling boat.

"*Phalarope* was the first boat I built, and took me about six months working nights and weekends," he said. "The sharpie is a good first boat, and is well within reach of the average woodworker. The hardest part is the rounded stern — you just have to take your time. The deadrise skiff was quite a bit harder. I wouldn't recommend it as a first boat to anyone but an excellent woodworker. And the lapstrake Whitehall pulling boat was by far the most difficult boat I've ever built.

"Each of these boats costs about $1,200 to $1,500. A third of the expense is lumber, another third is materials — such as hardware, sandpaper, paint, glues and other miscellaneous supplies — and the rest is in the sails and rigging. This is definitely a labor of love. If you didn't enjoy woodworking, it would never be worth it. Much as I enjoy sailing these boats, I enjoy building them even more. All told, I've built four boats. Lately, though, I've stopped building boats and have been making Chippendale furniture instead. This has pleased my wife no end — she says there's already enough boats around the house."



The 58-foot Alfonso *(above) was typical of the Core Sounders that evolved from North Carolina sharpies. The powerful rigging used on coasting schooners was added to a shallow-drafted sharpie hull, and the boats were used for oyster dredging in the sounds. Stripped of her rigging, the* Alfonso *carried freight under power in North Carolina waters in later years and finally burned on the Beaufort waterfront a few years ago, having spent its last years as a whaling museum.*



sharpie

rounded, half-decked stern was convenient to work around while fishing or tonging for oysters. Smaller sharpies were generally used for oystering or fishing for mullet, spot, croaker, trout, flounder, and other species. Larger ones — usually around 35 feet — were also used for fishing. Some transferred the catch from smaller sharpies to fish houses on the shore. Many of these larger models were "buy boats" that roamed the sounds buying fresh fish and shellfish from individual fishermen in smaller boats. Sharpies of all sizes were also used extensively in the menhaden industry, which was developed by several former Rhode Island soldiers who had served in occupied Beaufort during the Civil War."

By the late 1880s Tar Heels had added a few touches of their own to the design. Some innovative fishermen had tried using large sharpies to "dredge" or drag for oysters in the sounds, but found that the spritsail lacked the power needed to pull a heavy, iron oyster dredge. They replaced the spritsail with more powerful double-masted, gaff-rigged mains and topsails commonly used on coasting schooners, and the Core Sound schooner-sharpie, commonly called a "Core Sounder," was born. Most of these vessels were from 40 to 45 feet long. The largest Core Sounder was the *Prince,* a 63-footer built in Beaufort in 1899.

"Core Sounders were used much like Chesapeake Bay skipjacks," said Alford. "During the fall and winter, a four or five man crew dredged for oysters. In the summer the boats hauled freight. The Core Sounders often ran North Carolina fish to the West Indies and returned with sugar, molasses and rum. They also served as 'buy boats' for fishermen, and hauled general cargo in local waters."

Ironically, the man responsible for the introduction of the sharpie to North Carolina is also partially responsible for its demise. George Ives is generally credited with being one of the first to install a small gasoline engine in a sharpie in the early 1900s, and dwindling numbers of sailing sharpies were built after the turn of the century. The huge Core Sounders continued to run into the 1930s, often stripped of their rigging and delivering freight under power in local waters. However, the sharpie lives on in the Harkers Island boats and Core Sound trawlers and shrimpers that make our coast so picturesque today. The round stern, flat bottom amidships, and straight bow of these boats betray their sharpie lineage.

The shad boat is another North Carolina boat design — as beautiful a vessel as has ever graced our waters. It has its roots in the log dugout canoes used by coastal Indians. Early settlers modified these Indian dugouts by splitting them down the middle, adding a broad plank for a midsection that often included a carved keel, and joining the sections with ribs made of twisted tree roots. These boats were called "kunners," which is probably a corruption of the Indian word for "canoe." Small kunners were paddled or rowed, and larger kunners were equipped with a spritsail.

In the early 1870s a boatbuilder named Washington Creef of Roanoke Island went the kunner one better. Local shad fishermen needed boats to work their pound nets, which were large weirs made of wooden stakes that ran perpendicular to the shore. Large schools of migrating shad intercepted these nets as they traveled along the shore, and were diverted into holding pens called "pounds." The ideal boat for working a pound net was under 27 feet so it could enter the pound and remove the fish. It also had to be shallow-drafted, seaworthy, and capable of hauling a heavy load. In addition, it should carry a large spread of sail so that it could work in the light breezes of summer.

Creef began by making a half-hull model of a small round-bottomed boat with a sharply pointed bow, shallow keel, and a square stern. The keel and garboards (planks adjacent to the keel) of the boat were carved from a single log — as in a kunner — but the hull was finished with carefully joined planking. He rigged the boat with a spritsail, but added a single innovation — a small "flying topsail" was attached to the top of the mast and operated independently of the other sails. This topsail enabled the boat to catch the slightest puff of wind coming in over the treetops when it was working a pound net close to shore.

"Shad boats were prized by fishermen because of their seaworthiness, comfort, speed and graceful lines," said Alford. "Unlike sharpies, shad boats

Hampton Mariner's Museum

The largest of the Core Sounders was the Prince *(top), a 63-footer built in Beaufort in 1899. In the off-season, these boats carried general cargo and sometimes made trading voyages to the West Indies. Even a small spritsail skiff (right) similar to Ed Beck's could carry several men, nets, and up to a thousand pounds of fish or shellfish. With the centerboard up, these boats drew only several inches of water. Bill Hettler of Morehead City (above) built this deadrise skiff and equipped it with a flying topsail for added speed. Skiffs are much harder to build than sharpies, but aren't beyond the reach of a skilled amateur woodworker.*

were difficult to build, and a large group of boatbuilders who specialized in shad boats soon developed around Roanoke Island."

To build a shad boat the boatmaker first felled a huge white cedar tree, and hauled both the main log and stump back to the building site. The main log was carved into an elongated-Y that formed the keel and bottom boards — called "garboards" — of the boat. The stump was split into sections and taken to a sawmill in Elizabeth City where it was cut into two-inch slices on a huge bandsaw. These slices were to form the ribs and stem of the boat. Referring to his half-model, the builder selected a stem and ribs that matched the contours of the model. These were fastened to the log keel and garboards. Then, the boat was carefully planked so that the planking met the log keel and garboards in a graceful curve. Finally, the boats were painted white or gray and a colorful stripe was added along the gunwales. This was unusual because most North Carolina work boats were devoid of ornamentation.

The construction of shad boats changed around the turn of the century. Builders switched to using dead-rise planking (planks met the smaller keel at an angle instead of faring the planking into the single log that formed the keel and garboards) because large trees had grown scarce, and plank ribs replaced the natural crooked ribs and stem cut from stumps. Many of these shad boats were built for waterfowl hunting clubs on the Outer Banks, and the last shad boats made in North Carolina were built around 1930 by the Dough family of Roanoke Island for the Church Island Gun Club on Currituck Banks.

Fishermen who owned original shad boats prized them for their legendary speed, and the boats were often used for smuggling liquor during Prohibition.

Fortunately, about a dozen original shad boats remain, and these boats are still being used under power by commercial fishermen in the Manteo area. "All of the remaining shad boats are of the original design with the one-piece, log keel and garboards," said Alford. "Some of these boats are probably a century old. The boats that were built later with deadrise planking didn't hold up as well, and have all disappeared."

The Carolina spritsail skiff is another classic design that evolved in our waters, and this boat was often called the "mule of the coastal fisherman." Most skiffs ranged from 16 to 22 feet and were used for clamming, oystering, crabbing, fishing and general transportation.

The deadrise hull of the spritsail skiff had one unique feature — it lacked a keel. The center planks of the shallow, V-bottomed hulls met in a single seam which swelled to form a watertight joint. This reduced the draft of the hull considerably — a 20-footer drew only four to six inches of water with the centerboard up.

"The deadrise Carolina spritsail skiff was an excellent work boat and a very fast sailer," said Alford. "These boats carried a large spread of sail, and fishermen often raced their boats for pleasure on Sunday afternoons and holidays. However, there were differences in the design of these boats throughout the state. In the rough open waters of Albemarle Sound, for example, freeboard was increased and side decks were added to deadrise skiffs to make them better sea boats. Some Carolina spritsail skiffs were also built along sharpie lines. These boats had the flat bottom, straight sides and plumb bow of the sharpie but lacked a round stern. They had a shallower draft than a deadrise skiff, but weren't as fast or as seaworthy."

These boats were not used only for casual fishing and pleasure sailing, however. A 20-foot spritsail skiff routinely hauled several fishermen, a large net, and up to a thousand pounds of fish or shellfish. In fact, Hank Murdock lives next to an elderly man on Harkers Island who raised a family net fishing, oystering, crabbing and clamming from a small spritsail skiff.

Until recently, traditional North Carolina boats were found only in aging photographs and fading memories. The original sharpies and spritsail skiffs are gone, although a few rotting hulks probably lay undiscovered in remote marshes and creeks. Only a handful of shad boats remain to remind us of a time when tough men sailing small boats wrested a living from the water.

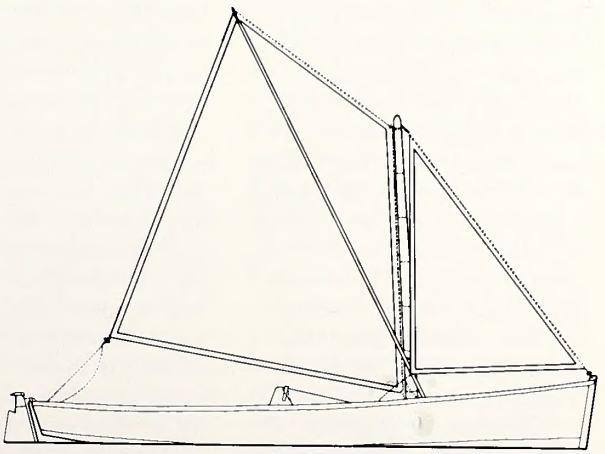
Happily, a new day is at hand. The work of the Hampton Mariners Museum has prompted a surge of interest in traditional boats, and gleaming white sharpies and spritsail skiffs built for recreational sailing are now docked amidst sleek fiberglass yachts on the Beaufort waterfront. Many people are also watching Bill Newbold's fishing with keen interest. He was recently featured in *National Fisherman,* a trade journal for the commercial fishing industry, and some knowledgeable observers feel that Newbold is proving that traditional sail-powered work boats such as the sharpie and spritsail skiff have a place in the future of commercial fishing. When I accompanied him, we returned to the dock with two boxes of crabs and a large tub of bluefish. On the run back to Harkers Island he quietly told me about his fishing as we watched Core Banks turn golden in the late afternoon sun.

"I began fishing with the sharpie for the joy of fishing from a classic boat, but I've found it to be a very practical boat for inshore fishing today. Like most fishermen, I go after whatever is in season. Much of my work is clamming, and I just beach the boat on a bar and get out. Since this boat draws only 8 inches of water with the centerboard up, she is ideal for oystering and crabbing in shallow waters. She'll also haul a load — I once brought in three tons of fish, although that was kind of risky. She's also a good sea boat. We fish in winds up to 35 knots, and in the spring and fall we go five to 15 miles offshore and set gill nets for spot, croaker and Spanish mackerel.

"Of course, there are some limitations to fishing under sail. We can't go as far as a power boat, and have to allow extra time in case the wind doesn't cooperate. However, fuel costs are minimal and this boat is very simple — there's nothing on it that I can't fix myself. A few years ago when fuel prices jumped, Hank and I were making money when most fishermen weren't. We're either revisiting the past or welcoming the future — depending on what happens to the price of fuel." ⊠

Hampton Mariner's Museum

This flatbottomed spritsail skiff (above) was photographed in 1905. Its skipper was an Audubon game warden. Side decks were sometimes added to make the boats drier, and the stripe along the gunwhales is an unusual touch of ornamentation generally found only on shad boats.

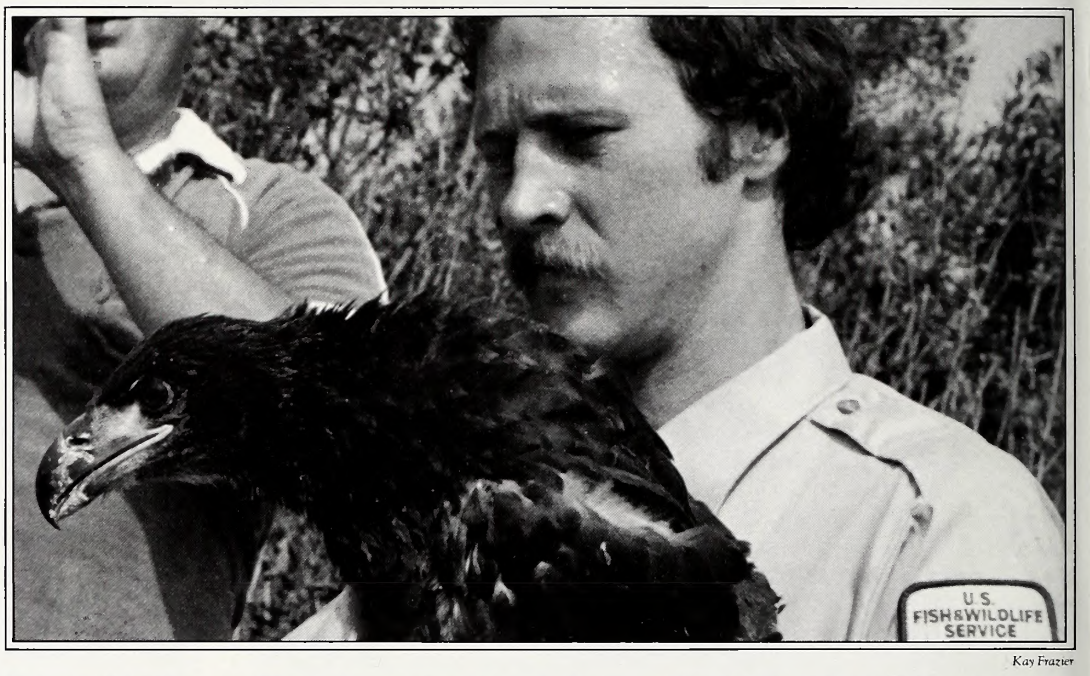


spritsail

Falcon, Eagle Projects Funded By Nongame Tax Checkoff

Peregrine Falcon Next In Line For Restoration In N.C.

Written and Edited by Mark Taylor



Kay Frazier

Checkoff Dollars At Work: *Income from the 1983 Nongame Wildlife Tax Checkoff is being used to support several endangered species projects such as the release of this bald eagle at the Lake Mattamuskeet National Wildlife Refuge in Hyde County. In addition, endangered peregrine falcons are being released from Grandfather Mountain this summer in an effort to restore these birds to the southern Appalachians.*

Peregrine falcons may once again soar over North Carolina thanks to citizens who contributed portions of their tax refunds to the North Carolina Nongame Wildlife Tax Checkoff. Tar Heel citizens contributed approximately $135,000 to the checkoff in its first year, and a recovery program for the endangered peregrine falcon is one of the endangered species projects that will be funded by the checkoff.

"We're very grateful to the citizens who contributed a portion of their refund from their State income tax to the North Carolina Nongame Wildlife Fund," said Debbie Paul, assistant to the director of the N.C. Wildlife Resources Commission. "We plan to focus on endangered species and conservation education in the first year of the program."

The peregrine falcon restoration project is the first new program to be funded by the nongame wildlife checkoff. These magnificent birds of prey are commonly sighted along the Outer Banks during spring and fall migrations, but once nested in the North Carolina mountains. Populations of peregrine falcons were almost completely destroyed by the use of DDT and other persistent pesticides in the 1950s, but have recovered since the use of these chemicals was banned in the early 1970s.

"The federal peregrine falcon recovery team has filled most of the suitable habitat in the Northeast, and has turned its attentions to the southern Appalachians," said Debbie Paul. "North Carolina was selected as a pilot project for the peregrine falcon recovery program, and four young birds were released from a site on Grandfather Mountain in mid-May. We were selected as the first to receive peregrine falcons in the Southeast because we had already identified suitable release sites, and the nongame wildlife tax checkoff provides a source of funding for the project. We will select additional release sites in suitable habitat in the future. It takes approximately two years for the young birds that are released to mature and return to nest, and biologists feel that it will take five to six years to release peregrines in all of the suitable nesting habitat in the mountains."

Two existing endangered species programs are also being continued using funds from the nongame wildlife tax checkoff. In mid-July, four bald eagles will be released from a hacking site on the Lake Mattamuskeet National Wildlife Refuge in Hyde County. Three eagles were released from this site last year, and biologists estimate that it will take 10 to 12 years to establish a nesting population of 30 bald eagles on the North Carolina coast.

The sea turtle project on Bald Head Island will also continue. Under the close supervision of the Wildlife Commission, volunteers from the Bald Head Island Property Owners Association are patrolling the beaches for nesting loggerhead sea turtles, protecting nests from predation with wire screens, and moving nests endangered by beach erosion to a hatchery. This cooperative program is being funded by the Association and the Nongame Wildlife Tax Checkoff.

"Checkoff funds have also been used to staff the nongame wildlife program," said Paul. "We've hired a full-time program coordinator, endangered species project leader, and an education coordinator. In addition to our endangered species recovery programs, several education projects are underway. We're currently developing an environmental education curriculum for our schools, and are producing brochures featuring the nongame program in North Carolina and endangered species of the state."

Do They Hibernate?

Sleeping Crabs Puzzle Reader

Dear Sir,

Years ago when I was about twelve years old and living in a northern state, the streams were cleaner and marine life more plentiful. Each spring some kid would issue the challenge to see who would be first to swim in the icy cold creek. The challenge really was to swim the mile between the two bridges. This was tidal water and we would time our start so we were helped by the outgoing tide. Into the water we'd go for our annual icy-spring marathon.

Now I couldn't swim a mile under any conditions and neither could most of the others, so about half way, the valiant contestants would all begin swinging towards the shallow water along the bank where we could wade and slog along in the ankle-deep mud. At this midway point, all the contestants were more than willing to bend the rules a bit. We also found that the air on our shivering bodies was colder than the water. But, the mud was warmer than either and our feet suffered the least from the cold.

Once in a while our feet would touch something hard down in the mud and we would stoop to drag up a full-sized, blue channel crab, apparently lifeless but in good condition. One look and we'd toss the crab away. One year, we sort of forgot the swimming contest and strove to see who could find the most crabs. Some of us wondered if they were dead or just asleep. And if they were dead why did they carefully dig down in the mud.

More recently I have wondered if we were interfering with a stage of hibernation in the blue crab's life cycle. I have delved into several books but have no answers. Most recently, I read *The Life Of The Seashore* by William Amos, (McGraw Hill). Many pages are devoted to the lives of a variety of crabs. Amos makes one small mention that, in the fall, "blue crabs head for the ocean and warmer water." There is no documentation, and I wonder if this is merely an assumption or an established fact.

When the crabs disappear in the fall back in the creeks and rivers, could they not dig into the mud for the winter? It might be rather hard to actually trace their migration back to the ocean. If they do go into the mud, this would certainly place them right where the action would be in early summer when the creeks and rivers are again literally teeming with big blue claws.

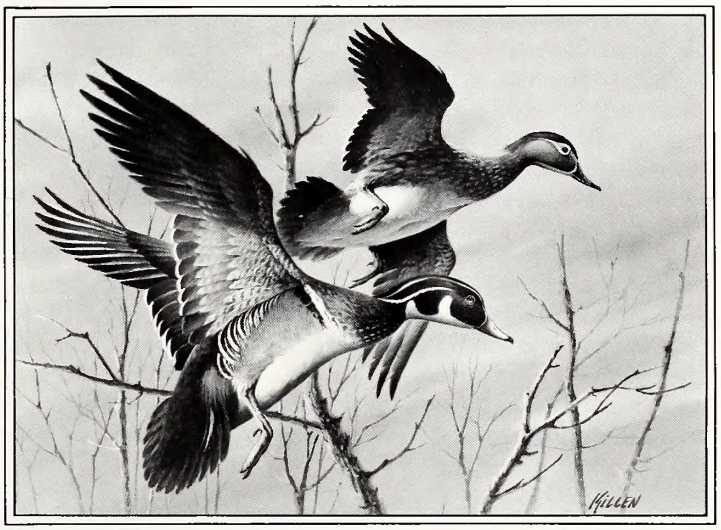
Is there a precise answer to my question? Do blue claw crabs migrate or hibernate?

—*Robert Harris*
Swansboro

According to Dr. John D. Costlow, professor of zoology and director of the Duke Marine Lab at Beaufort, many adult blue crabs in the Southeast do bury in the mud in colder weather. Though they are not actually hibernating, their metabolism falls and they are protected from the cold. There may also be some migration involved, and based on studies in the Chesapeake Bay, females migrate to the mouth of the Bay at Cape Henry in the spring, although they are seeking higher salinity, not warmer temperatures. At any rate, your observation that some adults bury and are ready to go at the first sign of spring is apparently accurate.

A Conservation Investment

Buy A Waterfowl Stamp Print



Don't Wait Too Long: *prints of the 1984 North Carolina waterfowl stamp may be ordered from art dealers throughout the state. The deadline for orders is August 31. The print features a hen and drake wood duck created by well-known wildlife artist Jim Killen of Minnesota. This is the second year of what is becoming one of the nation's most successful waterfowl stamp programs.*

Sportsmen and wildlife art lovers should save a spot on their walls for a print of the second North Carolina waterfowl stamp. These limited-edition prints of the state waterfowl stamp feature a hen and a drake wood duck printed by Jim Killen of Minnesota. Killen is a nationally known wildlife artist, a past Ducks Unlimited Artist of the Year, the 1983 Minnesota Wildlife Heritage Artist of the Year, and a winner of many other art contests.

Prints of the waterfowl stamp are not being retailed directly by the Wildlife Commission, but are being sold by art dealers throughout the State. The Wildlife Commission receives a royalty from each print, money that will be used for waterfowl management in North Carolina. The image size of the prints is 6½ by 9 inches. Prints cost $135, and waterfowl stamps—available from hunting and fishing license agents—cost $5.50. The deadline for ordering prints is August 31.

"We're sure that sportsmen and wildlife art collectors will be very pleased with the new state waterfowl stamp and art print," said Vernon Bevill, executive director of the N.C. Wildlife Resources Commission. "These prints are not only beautiful pieces of artwork, but their sale makes a real contribution towards waterfowl conservation in North Carolina. Last year, for example, over $600,000 was raised for waterfowl management in the state through the stamp and print program. Buying a waterfowl print and stamp is not only a good way to beautify your home or office, but is a good way to help wildlife as well."

Lifetime License Replaces Them

You'll Never Need Another License

Take a close look at your hunting and fishing license — it expired on June 30. If you haven't bought a new one yet, this might be a good time to invest in one of the lifetime hunting and fishing licenses offered by the Wildlife Commission. Proceeds from the sale of lifetime licenses are placed in the North Carolina Wildlife Endowment Fund, and only the annual interest from this fund is spent on wildlife projects. As this fund continues to grow, it will play a key role in supporting wildlife conservation in North Carolina for future generations.

"Lifetime licenses are not only good for wildlife, but are good investments as well," said Vernon Bevill, executive director of the N.C. Wildlife Resources Commission. "At current license rates, it would take only 10 years to break even on the cost of a lifetime sportsman's license.

"There is another advantage to lifetime licenses that is often overlooked. If the residency of the license holder changes, the lifetime license is still valid so holders of these licenses will never have to pay nonresident license fees. The same holds true with the lifetime sportsman's licenses for youths under the age of 12 and infants under one-year of age. For example, a grandparent could buy a lifetime sportsman's license for a grandchild who lives in another state, and that lifetime license would be valid for the rest of the grandchild's life."

Several lifetime licenses are available. Lifetime sportsman's licenses are available to nonresidents, adult residents, youths under the age of 12, and infants under one-year old. These licenses include all hunting privileges, all hook-and-line fishing privileges, and bow-fishing privileges. Trapping and special-device fishing licenses are not included in lifetime sportsman's licenses, however.

Lifetime hunting and lifetime fishing licenses are available to residents only. These licenses include only basic hunting and basic fishing privileges. Special-use licenses — such as big-game tags for hunting or trout licenses for fishing — must still be purchased annually.

Also, a special lifetime subscription to *Wildlife In North Carolina* magazine is available to anyone for $100.

Information and applications for lifetime licenses are available from license agents, Wildlife Commission employees, or the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Follow These Tips

Avoid Common Boating Hazards

Summer brings out hundreds of thousands of boaters on North Carolina waters, and the summer of 1984 may see the most boating activity in the state's history. The opening of new reservoirs — including lakes Jordan, Falls-of-the-Neuse, and Shearon Harris — has sparked new interest in fishing, pleasure boating and water skiing. With this increase in boating, however, may come a corresponding increase in injuries and even death.

Colonel Winfield Rhyne, chief of the Division of Enforcement for the Wildlife Commission, points out that many boating accidents can be prevented by taking the following precautions.

— Most boating accidents occur in late afternoon or early evening. Poor light is often a factor, and the stress of spending a day subjected to wind, sunshine and water often dulls boaters' minds and reflexes. For this reason, boaters should take breaks — especially during the hottest part of the day. If possible, boaters should get off the water and relax. Wearing polarized sunglasses will also reduce glare, and drinking plenty of nonalcoholic beverages will ward off dehydration.

As twilight approaches, avoid congested areas. Access areas, marinas, and narrow areas of lakes are especially dangerous as the light dwindles and most boaters head home. Be sure to turn on the boat's running lights before sundown so that if a problem occurs you have time to repair it. If your lights fail and can't be fixed, stay out of the main channel to avoid a collision. Carry a flashlight on board at all times.

— Unless you are completely familiar with a lake, be off the water before dark. Even when you know a lake like "the back of your hand," operating a boat at night compares with driving after dark in a car with no headlights. Changes in water levels and floating debris can provide even the most experienced boater with some unwelcome surprises.

— If you are caught by darkness, be sure to wear a personal flotation device (PFD). The terror of a boating accident is magnified in darkness because it is difficult to find survivors.

— Apply the recent furor over drunken driving to boating. Don't ride in a boat with a drunken operator, and report drunken as well as careless and reckless operation of boats to a local wildlife enforcement officer or call the Wildlife Commission's 24-hour, toll-free Wildlife Watch Hotline at 1-800-662-7137.

— *Terry Shankle*

Over 590 Participate

Shooting Tournament Popular

Ken Taylor

Shooting Up A Storm: *Over 590 students from 80 schools throughout the state recently participated in the 6th annual North Carolina Hunter-Safety Shooting Tournament, which is sponsored by the Wildlife Commission. To participate, students must be members of school teams and have completed a Commission-sponsored hunter-safety course. The overall winner of the event — and state champion for the third straight year — was Ledford Senior High School in Thomasville.*

Fear Not, Just Follow These Precautions

Have Alligators Moved Into Your Neighborhood?

Are alligators dangerous? The answer is not a simple "yes" or "no." Wild alligators are usually very shy and flee at the sight of man, but like a "park bear" an alligator that has lost its fear of man is potentially dangerous. Manly Fuller, a wildlife biologist who wrote on alligators in last month's *Wildlife In North Carolina*, offers these "do's and don'ts" when dealing with alligators.

— By all means, enjoy them from a distance. Alligators are fascinating animals to watch or photograph, but they are wild animals and should be treated as such. Never approach a large alligator too closely. Within short distances, the animals can move much faster than you can. I was once lightly bitten on the arm by a small captured alligator. The rope around its snout slipped, and it bit me so quickly that I never saw it move. After that, I forsook rope for liberal applications of duct tape.

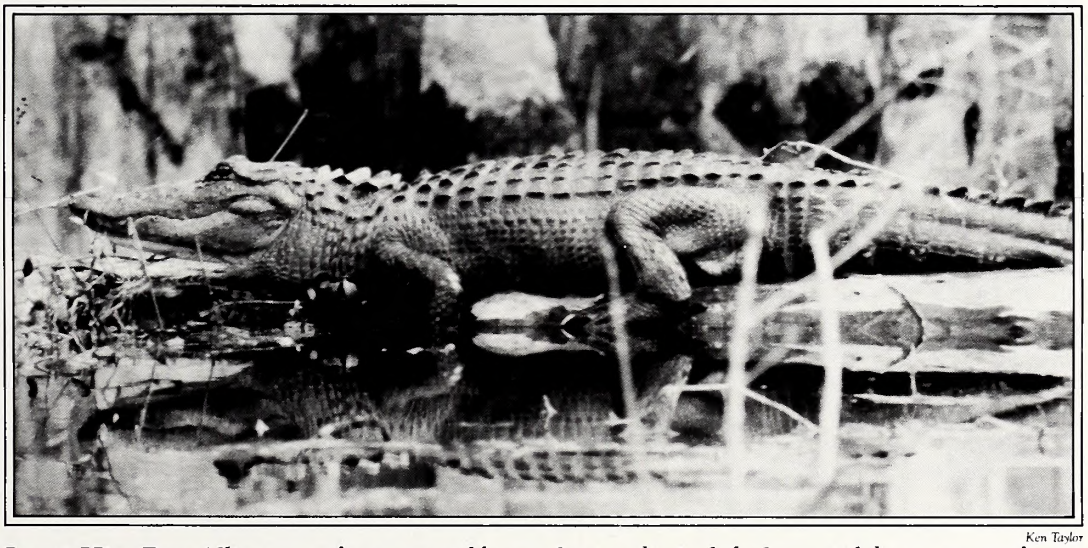
— Never feed alligators. The animals quickly come to expect a handout, and one day they may not distinguish between the handout and your hand. These "tame" gators also become nuisances as they lose their fear of man. Tragically, many of these alligators are illegally shot out of fear or because they offer such an easy target.

— Do not molest or antagonize an alligator. In the first place, it's against the law, second, it's not smart. In south Florida, I once saw a man walk up to a 10-foot alligator resting beside a pond. That was bad enough, but then he began kicking the animal in the ribs. After a few seconds, the alligator slid into the water to escape this abuse. The man was very lucky; he could have paid for such stupidity with serious injury or even his life.

— Do not train dogs in the summer in waters where large alligators are found, or allow pets to swim there. Alligators will occasionally attack a swimming dog. Also, do not swim in these waters yourself late in the afternoon or at night. Alligators may feed at any time, but are most active late in the day and in darkness. Although the chances of an attack are slight, several people are bitten each year by alligators in Florida. There have been no recorded alligator attacks on humans in North Carolina in the past century.

— Leave alligators alone, and they'll often move on. Alligators move about in late spring and early summer seeking a mate or establishing new territories, and may take up temporary quarters in some unlikely spots such as backyard ponds. If left alone they will usually move on in a few days especially if a good food source is not available (once again, don't feed them). However, if the animals remain and you are concerned, contact a local wildlife enforcement officer, the U.S. Fish and Wildlife Service in Asheville, or a biologist with the N.C. Wildlife Resources Commission.

— Remember that alligators and their eggs, nests, and young are protected by law. Anyone convicted of harming or killing an alligator in North Carolina is violating the Federal Endangered Species Act, and may be subject to a large fine (up to $10,000) and imprisonment.



Ken Taylor

Leave Him Be: *Alligators make great neighbors as long as they're left alone, and the worst mistake is to feed them. Once dependent upon handouts, alligators can become a nuisance, and may even be dangerous.*

Free Subscriptions Restored

Wildlife In North Carolina Goes To Schools

Wildlife In North Carolina magazine will soon be sent free to school libraries throughout the State.

"We recognize that *Wildlife In North Carolina* is a valuable resource for students and teachers," said Jim Dean, editor of the magazine. "In years past, free subscriptions were sent to schools, but the funds for these complimentary subscriptions have not been available in recent years. However, we were able to make a special request for the funds needed to restore these free subscriptions.

"Schools need not contact us to obtain free subscriptions since this will be done automatically. Schools that already have paid subscriptions will also continue to receive these subscriptions, and may want to renew them after they expire in order to have an extra copy.

Calendar Of Events

July 2-6
Cap'n Fannie's Billfish Tournament at Atlantic Beach. For more information contact Anchorage Marina—Bill Christian, P.O. Box 7, Atlantic Beach, N.C. 28512.

July 4
9th annual Lumber River Canoe and Raft Regatta at Riverton Park in Wagram. Canoe and raft races, music, and other events. For more information contact the Scotland County Parks and Recreation Department, P.O. Box 1688, Laurinburg, N.C. 25352.

July 13-15
Beginning of America's 400th Anniversary Commemoration at Roanoke Island. For more information contact the N.C. Division of Cultural Resources, Raleigh, N.C. 27611.

July 14-15
29th Annual Grandfather Mountain Highland Games and Gathering of Scottish Clans at Linville. For more information contact Grandfather Mountain, Linville, N.C. 28646.

July 19-22
37th Annual Guild Fair of the Southern Highland Handicraft Guild at the Asheville Civic Center. Features arts and crafts and folk entertainment. For more information contact the Southern Highland Handicraft Guild, P.O. Box 9545, Asheville, N.C. 28815.

July 27-29
John Rowe Trap Shoot at the Pinehurst Gun Club in Pinehurst. For more information contact the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

Smoke A Lunker

Covered Grill Can Barbeque Big Fish

The best fish for the table are almost invariably the smallest. A one-pound bass, 8-inch trout, or a two-pound bluefish are all more flavorful than their larger brethren.

It is a rare fisherman, however, who admits fishing for small prey. Everyone is after a bragging-sized fish, and sooner or later every persistent fisherman catches one. Assuming you've caught all the 8-pound largemouths the living room walls will hold, what should you do with the next lunker brought to net? Many fishermen release big fish to fight again. If you choose to keep the lunker, however, one of the best ways to prepare it is to charcoal-smoke the fish. Try the following recipe for your next big fish—it works equally well for fresh and salt water species.

Barbecue-Smoked Fish

A hooded charcoal grill is needed for this cooking technique. Start by filling a tub (at least five gallons) with oak, hickory, maple, apple or other hardwood chips that have been debarked and are unpainted. Cover the chips with water and soak overnight. The next day, fire the entire grill with charcoal briquettes two layers deep, and burn until the briquettes are white-hot and beginning to build up ash.

Then, dress your fish. If necessary, remove the head and tail so that it will fit on the grill. Wash and wipe the fish dry, rub the body cavity with lemon, and sprinkle inside and out with salt, pepper and other spices of your choice. Tuck a sliced onion, sliced green pepper, and a few branches of fresh dill, savory or parsley into the body cavity. Lay the fish on top of a heavy piece of aluminum foil on the rack of the grill and fold the edges of the foil so they form a pan that will contain the juices.

Now, go back to the grill. Remove the chips from the tub, and shake off excess water. Then, spread the chips directly on the hot coals. This should smother the coals entirely and result in a dense, moist smoke. Place the rack with the fish six to eight inches above the chips, and cover with the hood. Keep the cover closed—checking only occasionally to see that an adequate supply of chips is present, and that the chips aren't flaming.

It takes about two hours to cook a 10-pound bluefish, or about 30 minutes for each inch of fish at the thickest point of the body. After 1½ hours, test to see if the fish is done. If the flesh flakes to a fork, it's ready to eat. Simply remove the stuffing from the body cavity, carve, and chow down right from the rack. Grilled stuffed tomatoes and a salad go well with this course.

Any big fish may be smoke-cooked. However, lean fishes—such as walleye—require "larding." Just tuck about a quarter-pound of butter in chunks in the body cavity, rub the fish with oil, and lay a few strips of bacon on top—then enjoy!

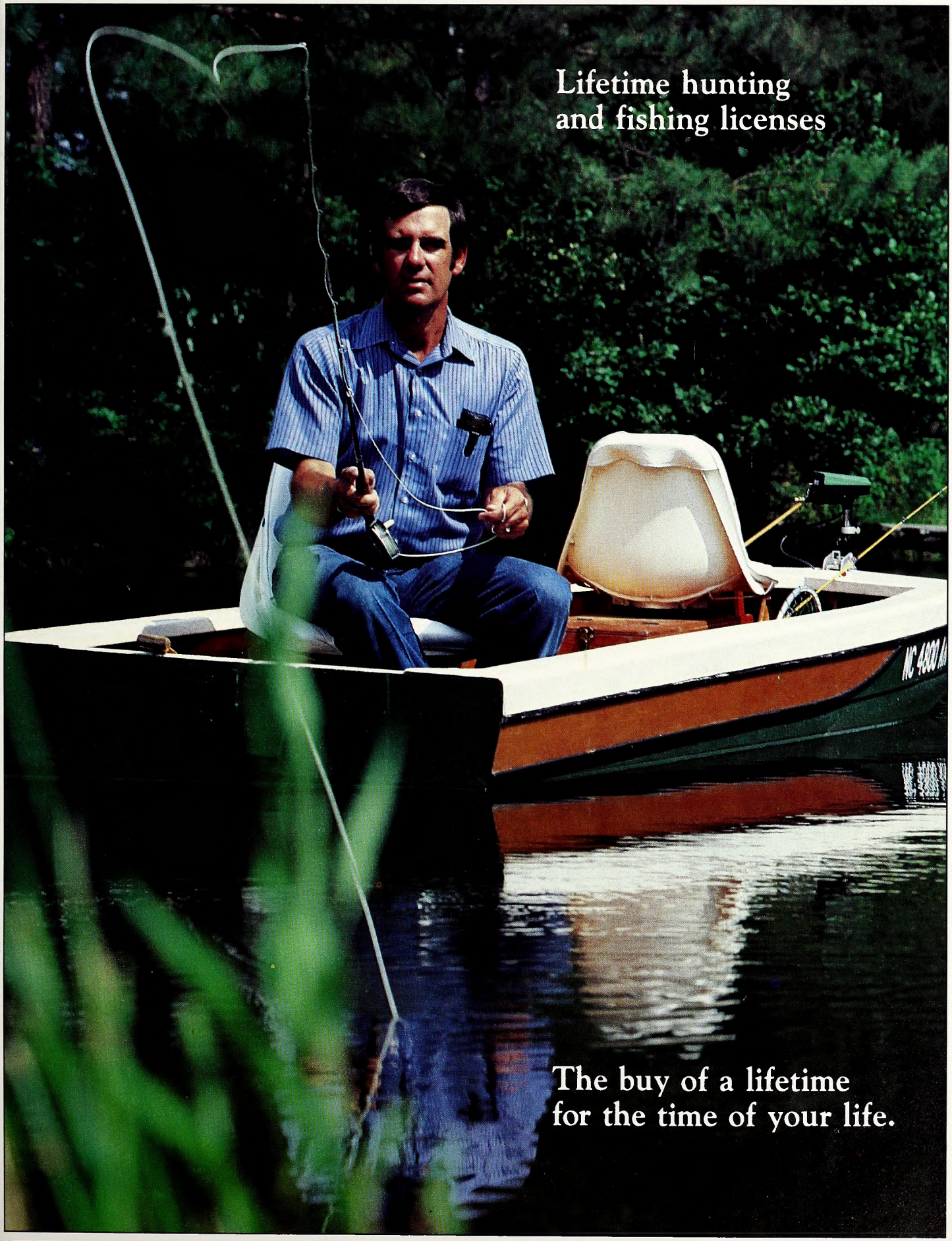
—*Curtis Wooten*

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on March 31, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	7,598	$2,228,365.42
Lifetime Hunting License	94	16,215.86
Lifetime Fishing License	348	57,874.49
Lifetime Subscriptions to Wildlife in N.C.	258	29,020.97
Contributions	—	36875.11
	Fund Total:	$2,368,351.86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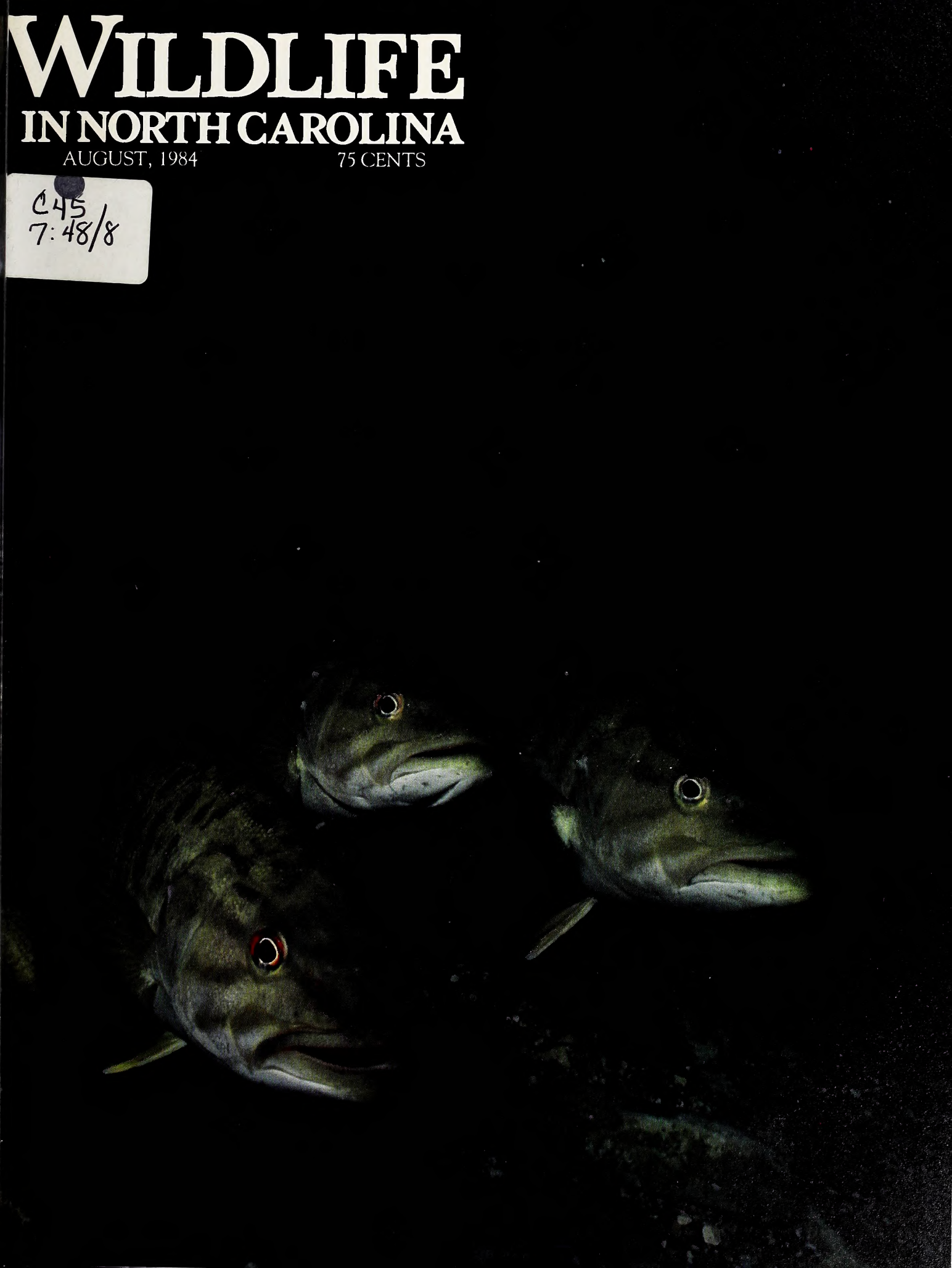


The Invisible Angler

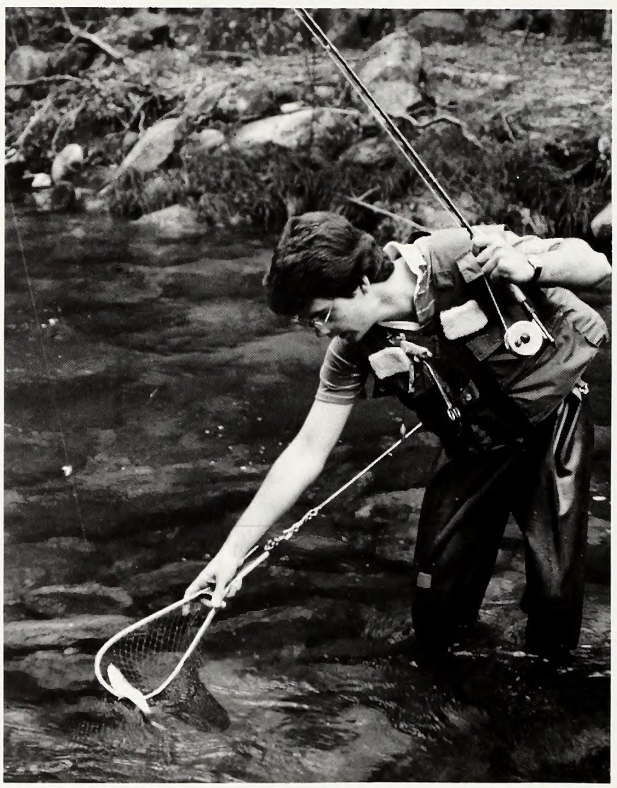
by Jim Dean

It is no secret that fishermen tend to be loners. Unlike fans of such spectator sports as baseball or football, they have no desire to share their pleasure with 50,000 other anglers. Indeed, in some cases, they'd rather not even see another fisherman.

One fall when I had occasion to fish the holes and guts in a particular salt marsh for speckled trout (spotted seatrout), I witnessed a prime example of the lengths to which some fishermen will go to avoid their fellow man.

Two anglers had located a prime trout hole and they were catching lots of nice specks, but everytime another boat approached, these fellows would pretend to be answering a call of nature or eating. If they had a fish on the line, they'd freespool the reel and sit nonchalantly as though nothing was biting. You can't imagine how bored they looked.

If passing fishermen stopped and asked them if they were having any luck, they'd tell them they hadn't had a nibble and that they were thinking of trying some other spot. Then, one of them would get up, stretch and yawn, and pretend to be pulling in the anchor. All the while, his buddy would be sitting there watching nervously out of the corner of his eye as the line peeled off his reel. It was a masterful job of deceit which we witnessed through binoculars from our own secret spot several hundred yards away.



Jim Dean

One out of four Americans fish, yet fishermen are not nearly as visible as other sporting enthusiasts.

Not only do fishermen tend to avoid one another, they usually pursue their pleasure in places where they are not seen by the general public. While 50,000 baseball fans in a stadium are highly visible—made more so by television—50,000 fishermen are virtually invisible. Also, because fishermen are often loners and their sport, with few exceptions, is basically noncompetitive, fishing generates only a modest amount of media attention outside of special fishing publications. There are newspaper columns, of course, and a few TV shows, but nothing to compare with the space or time given to football, baseball, basketball or even golf and tennis.

The problem is that most nonfishermen haven't the foggiest idea that sport fishermen constitute one of the biggest and potentially most influential groups in the nation. Worse, many fishermen also fail to recognize this potential clout.

For example, even the most rabid foe of professional football would admit that the sport has millions of followers and generates billions of dollars for the economy. The 1983 *Miller Lite Report On American Attitudes Toward Sports* found that one out of four Americans attend spectator sporting events more than 20 times a year, and three out of four watch some form of spectator sport on television at least once a week.

Football is the favorite spectator sport, and 28 percent of Americans say that it is the sport they most like to watch. Many other sport fans will watch football if their favorite sport is not on the tube at the same time. That's impressive, and hardly surprising. Yet how may people—including fishermen—know how the numbers of sport fishing fans rank in comparison?

Actually, the number of fishermen compares favorably. More than one out of four Americans fish in fresh or salt water (or both) according to statistics compiled in 1980. Of this number, 42.1 million were 16 years or older, and an additional 11.8 million were 6-15 years old. Those over 16 took a whopping 751.2 million fishing trips and fished for 857.6 million days. One study suggested that the total number of licensed and unlicensed fishermen would exceed 65 million.

Nor was that recreation cheap. Fishermen spent an incredible $17.3 *billion* dollars for an average of $412 per fisherman. Those, mind you, are the statistics for just one year.

It is doubtful that there are many larger special interest groups in the nation spending that kind of money, and yet as a group, fishermen have never wielded the kind of influence they're capable of. Like Rodney Dangerfield, fishermen haven't gotten much respect, but that's partly because of the nature of the sport and the anglers who take part. Yet, with more than 50 million participants spending over $17 billion a year, fishermen represent one of the biggest industries in the nation.

Maybe it's time fishermen overcame some of their solitary traits and began thinking of better ways to harness some of this clout. There are lots of organizations that represent the interests of fishermen to some degree, but there is no single umbrella organization to spread the word and fight for the concerns—environmental and otherwise—of us, the nation's anglers.

All too often, when somebody wanted our favorite spot, we've pulled anchor and let them have it. Like those speckled trout fishermen, we may need to develop better strategy and make sure that everybody knows who we are, how big we are and how much we spend. And they need to know we're here to stay. Only then will our needs and concerns assume their rightful importance.

August, 1984
Volume 48, Number 8

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Cover *Smallmouth bass line up for a portrait by photographer William Roston, but does this constitute a school of fish or just a group? Scientists are still puzzling over that question (see page 4).*

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Smallmouth bass protects its nest from a group of hungry sunfish. Not all groups of fish are necessarily schools. The sunfish here were attracted to the bass eggs and swam together to eat. Schooling fish, however, are attracted to each other, not to something else. They instinctively swim together even as fry.

If you think you know what makes a school of fish, maybe you ought to go back to school yourself. It's a subject that can get complicated.

Why Fish School

by Lawrence S. Earley

In the creek shallows a group of 20 minnows flash this way and that as if they were one. In a farm pond, 10 largemouth bass swimming together toward a group of tiny bluegills turn to avoid the dark shape of the fisherman's boat above. Out at sea, a million menhaden migrating north make a course adjustment in less than an eyeblink.

Three groups of fish, each group exhibiting the synchronized movements that have delighted children and puzzled scientists for centuries,

Divers drift past a school of young fish while tomtates — a nonschooling species — swim in a group below. The juvenile stages of many marine and freshwater species school and then take up more solitary habits as adults. The schooling instinct is thought to have evolved in deep water where cover is lacking and fish are vulnerable to predators. Many salt water species such as jacks (left and right) school because of the vast areas of open water. But in muddier fresh water schooling is not as important, and the best strategy for a prey fish is not to move. Scientists say that 5,000 out of the 20,000 fish species are schoolers.

movements that recall the flocking maneuvers of shore birds. Three groups of fish — but which group is a school?

Scientists in this century have been persistently trying to answer that question and crack other mysteries of fish schooling. Through the work of American researchers such as C.M. Breder and Evelyn Shaw as well as the Russian scientist D.V. Radokov we now know more than ever about the nature of a fish school and its internal structure. High-speed photography has even analyzed that most amazing characteristic of a fish school, its apparent synchronous movements, the way the entire school changes direction simultaneously. New hypotheses explain why fish school and how the school stays together.

Here are some research findings, chosen at random:

— As many as 5,000 of the world's 20,000 fish species school.

— Schooling fish of all species tend to have the same sleek shape and the same silvery coloration.

— Fish schools are generally composed of fish of the same size and age. Scientists say that this ensures that no fish stands out. One researcher remarks, "In a fish school, individuality is not profitable."

— Schools tend to break up at night, leading researchers to speculate that schooling is governed by an inner clock similar to the clock in some flowers that causes them to open in the morning and close at night.

— Schooling fish cannot swim backward, an adaptation that may reinforce the forward thrust of the school.

— Fish schools come in different shapes, from the long ribbons favored by herring to the amoeba shape of a menhaden school.

— The schooling instinct, as advantageous to fish as it is, is contributing to the decimation of several marine species because mobile and resourceful commercial fisherman exploit vast numbers of the highly visible schoolers.

And yet it seems that the more we know about schooling behavior in fish, the more elusive the phenomenon remains. Even the definition of "school" has been controversial. What is a school? Examining a wide variety of fish, scientists early on found the following to be typical of schools: (1) The fish in a school are "polarized," or facing in the same direction; (2) they are spaced evenly; (3) they are the same size; (4) they exhibit synchronized movements.

Immediately there were problems. What about fish that only schooled in this way part of the time, at other times showing a much looser organization or even breaking up entirely? Were these schooling fish? In addition, some fish spent only part of their lives schooling in this way. Largemouth bass, for example, school when they are juveniles under the watchful eyes of a parent, but not as adults. Estimates are that almost 50 percent of all fish school as juveniles. Were these schooling fish?

Trying to distinguish schooling behavior from nonschooling behavior was getting to be like looking at a color spectrum and trying to tell where one color began and another ended. The boundaries were hard to find. Scientists slowly came to the conclusion that there were two kinds of schooling fish, those that schooled occasionally and those that schooled constantly. It was also quite clear to them that not all groups of swimming fish were schools. Largemouth bass in the farm pond swimming toward a feeding area do not make up a school, although they look like a school.

> "There are no leaders in a school. After a right-angle turn, the fish that were on the right flank are now in the front row and those that were in front are on the left. Without leaders, how do fish know when to turn?"

The difference is that true schooling fish have an innate need to be with one another. They are mutually attracted. A nonschooling group of fish — called a "shoal" by some — is brought together by something they are attached to or repelled by. John Miller, Professor of Zoology at N.C. State University, puts it this way: "A school is a group of fish that like each other in common; a shoal is a group of fish that like or dislike *something else* in common."

Thus, schooling fish familiar to North Carolina fishermen would be the following freshwater species: threadfin and gizzard shad, golden shiner minnows, white bass, and white bass-striped bass hybrids. Marine schoolers would include herring, mackerel, bluefish, mullet, jack, pompano and menhaden.

One of the most interesting subjects of research into fish schooling is the internal organization of the school. A school is not just a loose pack of fish, haphazardly arranged. It has a precise organization especially during migration or where menaced by a predator. Each fish maintains an exact spacing from its

neighbor fish, usually about one half to one body length. The fish do not swim head to tail and side by side, but slightly to the right or left of the fish in front of it in a diamond pattern. Such an arrangement evidently makes sense. If a fish swam directly behind another fish it would be swimming against the wake created by the fish's moving tail. Positioned diagonally, however, the fish may even be pulled forward by a current created by the tails in front of it. Thus swimming in the school may take less energy than swimming alone.

As fish swim, they make small and large adjustments in course, all seemingly in perfect unison. This, of course, is the most spectacular and visible characteristic of fish schools. But there are no leaders in a school. After a right-angle turn, the fish that were on the right flank are now in the front row and those that were in front are on the left. Without leaders, then, how do fish know when to turn?

One experiment with high-speed movie cameras revealed that an entire school turned at a 90 degree angle within half a second. But though the eye registers such a movement as instantaneous, the movie cameras revealed something else. Before the school as a whole turned, groups of three or four fish in various parts of the school had turned first. Other experiments in the Soviet Union have shown that changes in direction spread through a school like a wave.

Fish school movements, then, are not as instantaneous as they look. When the school turns to avoid a predator or to move toward food, most fish in school are reacting without ever "knowing" why. They are following the movements of neighboring fish. Relatively few of the fish ever directly see the predator or the food.

And yet this does not explain how fish are able to maintain the school shape and the spacing within the school while performing quick turns. Senses are involved, but which ones?

Researchers have found that sight is the main sense involved in fish joining a school in the first place. Fish must see in order to school. But evidently vision does not help them maintain their place in the school. Some claim that it is another "sense" that does this, a sense that humans do not have — the lateral line. The lateral line is a nerve running from head to tail that is sensitive to changes in water pressure (see pp. 2-3). Some scientists think that fish are able to keep within a maximum and minimum distance from each other by sensing the water movements around them with their lateral lines.

Why do fish school? There have been no shortage of explanations. Evidently it is an advantage, or else the approximately 5,000 species that school would not have developed the instinct. Schooling, according to some, makes it easier for fish to reproduce (less time wasted on hunting for a mate), to learn (the individual derives the benefit of the group), to swim, to find prey (if you're a predator) and to escape predators (if you're a preyfish).

The fact that schooling is good for both predator and prey may sound contradictory, but it's not. Mathematically a school is a good place to be if you're a preyfish. It shouldn't seem so — a school ought to be a inviting target for predators. But scientists have found that a schooling fish has a better chance for survival than a solitary fish. Solitary fish are eaten faster than schooling fish. There are other reasons, as well. A large school may appear to be a very large and menacing object to a predator, effectively scaring it off. A school also has many more eyes than an individual fish and can react faster to the approach of a predator. And some predators may tend to be confused by the evasive strategies employed by schoolers. Experiments have found that when some predators approach a school, the ranks of fish part to allow the predator entrance and then close around it. The flashing bodies of the densely swarming fish tend to confuse the predator, making it harder for it to select a target.

"It is a sad irony that schooling, which developed to protect fish from predation, has today made many marine species vulnerable to that arch predator, man. A commercial fisherman with the latest technology is a predator that a school has no defense against."

That may be the reason why many predators school, say researchers. The difference between a school of predator blues and a single bluefish is the difference between an M-60 machine gun, and a single-shot .22. When blues go after menhaden, they cut through their ranks like a hot knife through butter, disorienting them and causing them to lose the school temporarily. A terrified fish escaping from one bluefish might pop right into the jaws of another.

It is one of the sad ironies that schooling, which developed over millions of years in order to protect fish from predation, has today made many marine species vulnerable to that arch predator, man. A commercial fisherman with the latest technology is a predator that fish have evolved no defense against.

"Overexploitation of marine fishes is a problem up and down the East Coast," explains Charles S. Manooch, research biologist with the National Marine Fisheries Service in Beaufort. "The Atlantic menhaden is an excellent example of a species pursued by fishermen for years and years without being adversely affected. But in recent times, spotter aircraft have been used to find the schools which are easily visible. The aircraft radios to purse boats that surround the school.

"Menhaden are being heavily exploited because of their high visibility," he said. "They are in real trouble."

N.C. State's John Miller also reflected on the problem of schooling fish and their abilities to withstand heavy predation. "Schooling is a benefit for fish in competition with another fish predator," he said. "But not against man. Herring, California sardine and now menhaden are species which have been vulnerable to overfishing. Generally fishing has a self-regulating mechanism: as fish numbers decrease, the fishing pressure goes down and in time the fish populations rise.

"But now a fisherman owning a big, expensive boat has got to get his money out of it. He can't wait for the fish population to bounce back. These schooling fish are spottable. He can find them and still make money. It's commercially viable, therefore, for him to exploit that last school."

He likens what is happening to schooling species such as menhaden to the extermination of the passenger pigeon, another species that traveled in tremendous numbers. "Our track record is poor for schooling fishes," he says. "Some fishermen don't give a rip about exploiting the resource so that there is nothing next year or down the line."

The schooling instinct may be getting some fish in trouble, but for most it is still the safest way to go. Crossing the fathomless depths of the open seas, as well as the deepest parts of the big inland lakes, schools of fish continue to draw safety in numbers. And like the wheeling flights of starlings at evening's last light, they continue to evoke awe and wonder in those of us who see them. ⊠

COASTAL PORTRAITS

watercolors by Robert Herr

North Carolina artist Robert Herr has chosen fishermen and scenes of all types for this series of unusual watercolor portraits.

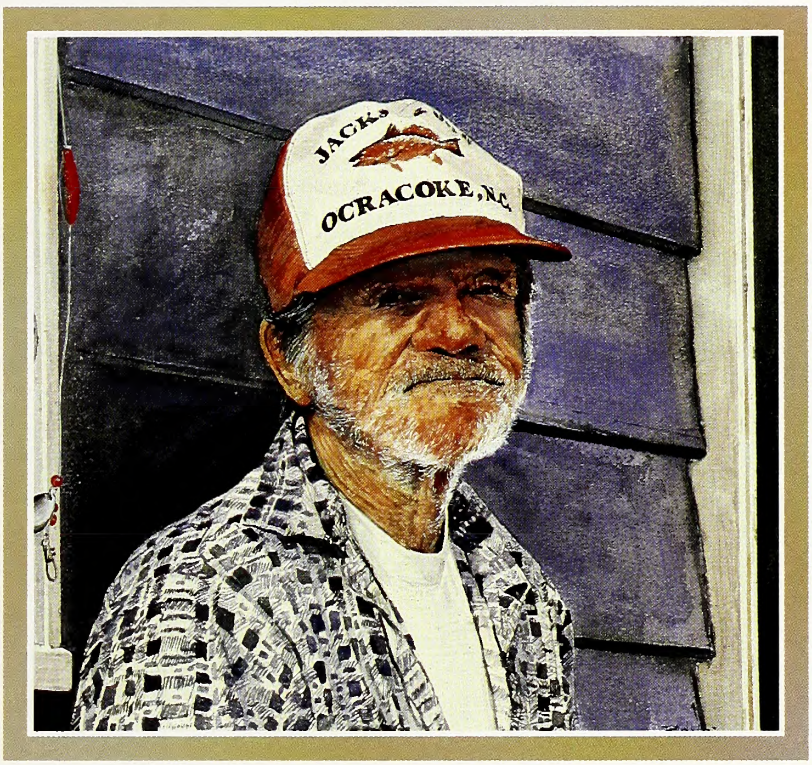
The Mary J. at Oriental

I found this boat tied up at a dock in Oriental three or four years ago. It was a really hot day, but I liked what I saw so I stayed around long enough to make some quick sketches and shoot some photographs, then I finished the painting in my studio.

Nor'easter Brewing

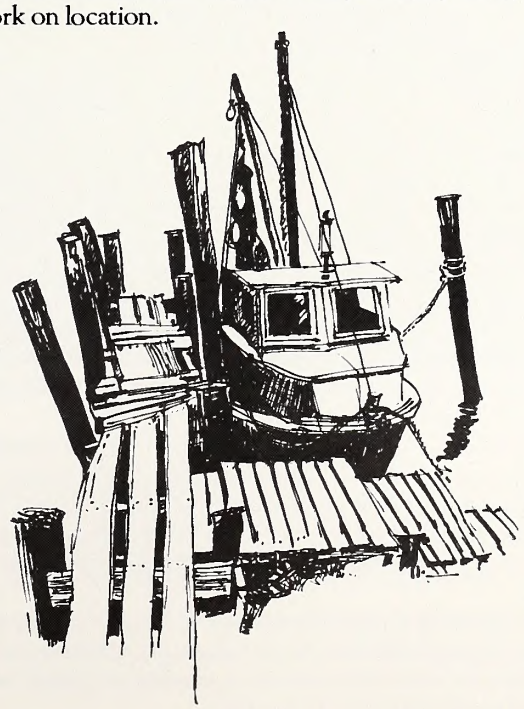
One cold day in November, I was driving around up towards Cedar Island, and I spotted this scene at the coastal town of Atlantic. A storm was coming up, and I liked the raw look of it. I couldn't get quite the perspective I wanted, so I borrowed a raft and poled it out into the water to get a better look at the whole scene the way I wanted to paint it.

COASTAL PORTRAITS



Owen

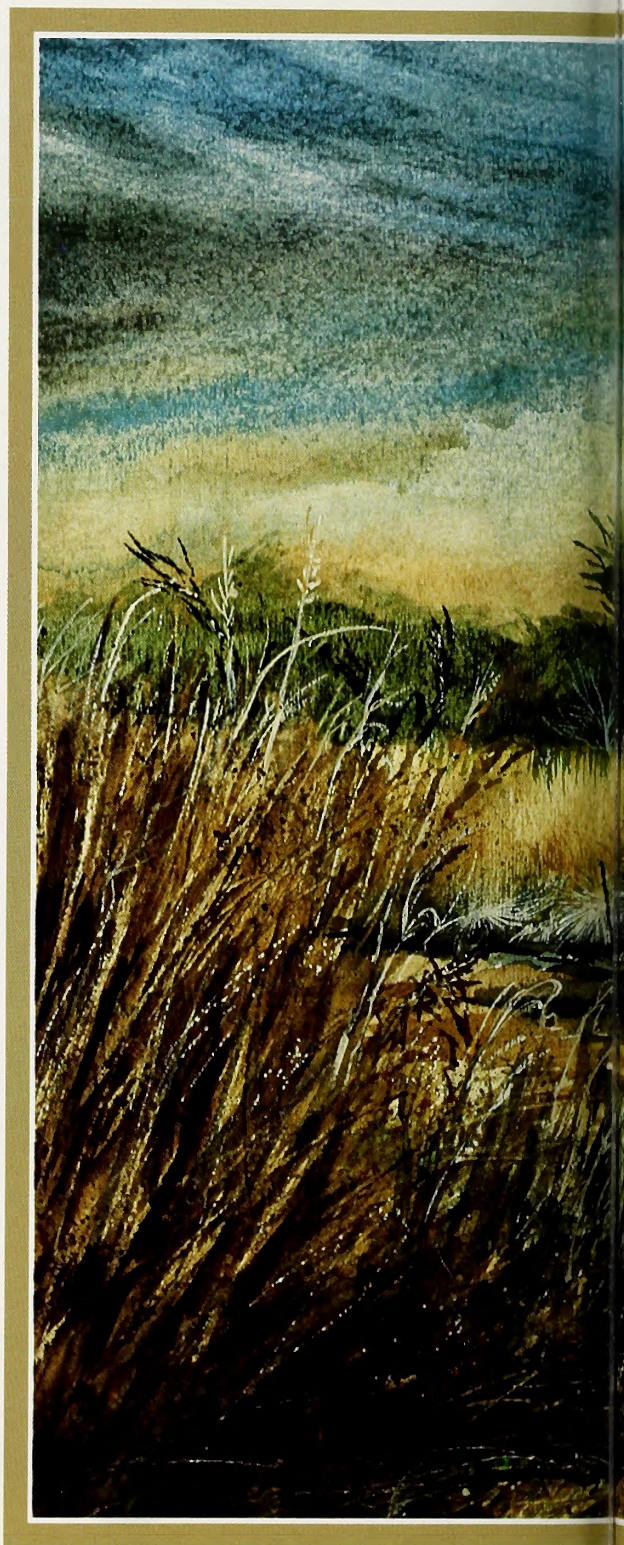
I met Owen — I think his last name is Gaskill — on a trip to Ocracoke. I really enjoyed talking to him and hearing about life on the Outer Banks. He's retired, and told me he'd only been off the island once in his life, during World War II. While we talked, I did some sketches and shot some photographs, then finished the watercolor later. That's the way I usually work; I rarely do a finished work on location.



COASTAL PORTRAITS

Baiting Up

I was rambling around Beaufort early one morning looking for an interesting subject when I saw this fellow getting ready to fish near the small bridge to Radio Island where Duke Marine Lab is located. I liked the setting and the clothes he was wearing. While I was sketching, he caught several fish.



There are lots of good artists in North Carolina who choose outdoor scenes, and perhaps even more who find coastal subjects irresistible. Occasionally, however, someone's paintings seem to stand out as distinctive and especially appealing. That could be said of the watercolors painted by Robert G. Herr of Cary. And that seems particularly true of a series of watercolors Herr has recently painted that feature our coast and the people who live and visit there.

Born in Hazleton, Pennsylvania, Bob—as he prefers to be called—has spent the past 25 years in North Carolina. "For years, I concentrated largely on landscapes, especially old barns and subjects of that sort," said Herr. "I felt, however, that I wasn't learning anything anymore. I particularly wanted to paint scenes with people in them.

"About a year and a half ago, I decided to begin a series of paintings set along the coast," he said. "I guess you could call them portrait landscapes, and the reason I picked the coast is because I like the down-to-earth style of life, and I like the people who live it. I like to get out and wade in the water with them, talk to them and learn from them. And, of course, I also like to paint them."

The paintings shown here are part of Herr's coastal portrait series which already features over two dozen paintings and is not complete yet. As is the case with the watercolors shown, some feature people while others simply suggest a way of life. ⊠ *by Jim Dean*

Backwater At Pamlico

I had passed this old boat shed on a creek west of Oriental several times and thought it would make a good painting, but I'd never seen a boat under the shed. One fall day, this boat was backing in just as I passed so I stopped. I was intrigued by the stark white of the boat against the colorful tidal creek.

It's Knot What Counts

by Jim Dean

Jim Dean

Even the most skillful fishermen will fail if they can't depend upon the link between angler and fish.

Sooner or later it happens to everyone who fishes. You hook a good fish and just about the time you're beginning to think you might have a chance to land it, the line goes limp. It's a sickening feeling, but the worst is yet to come. When you reel in your slack line, there's a tiny pigtail in the end where the knot came untied. Then you remember how carelessly you tied it.

It's a bad feeling because when a knot comes untied, you're stripped of all possible excuses—a heckuva plight for any self-respecting fisherman. The hook didn't pull out, nor did the fish jump and throw it. You can't truthfully say the hook broke, or even that the fish was so big that he broke your line. Nope, the fault lies with the knot and the one who tied it.

When it comes to knots, there seem to be two extremes. There's the knot freak who can whip out clinch knots, uni-knots, Palomars, Bimini-twists, Spyder-hitches, nail knots, heat twists, barrel knots, blood knots, Albright specials, turle knots and dozens more. Furthermore, he not only knows how to tie a turle knot, he knows that most fishermen mistakenly call it a "turtle" knot.

Quite honestly, it pays to be a bit of a knot freak, especially if you fish in both fresh and saltwater, and use conventional spinning and fly fishing tackle. If you don't know a lot of these knots, your tackle will not always be rigged properly. You'll lose more fish, and you may not even hook as many to start with.

Alas, most of us are far too casual about knots. Even some surprisingly good fishermen may know how to tie only one or two knots—possibly inferior knots at that. To them, a Bimini-twist sounds like a wrestling hold, an exotic drink or some new dance. They use the same knot they learned as a child regardless of whether they're tying a lure on a spinning line or attaching a bream hook to the line on a cane pole.

You'd think it would be obvious that the finest tackle and the greatest angling skill are no better than the knot that connects the hook or lure to the line. But apparently that's not the case or else we wouldn't have to contemplate a "pigtail" from time to time.

Now, if you've used the same kind of knot for 20 years and never lost a fish because it failed, you can skip the rest of this. But if you'd like to make sure that the knot you're using is a good one, read on.

Probably the most widely used knot is the clinch knot (Fig. 1). It's easy to tie, but even when it is tied carefully, its strength may be only 50 to 70 percent of the line strength. Tied carelessly, it's even less. The improved clinch knot (Fig. 2) is a much better knot, yet it also is likely to test out at only 85 percent or less of the line strength when carefully tied.

Even so, the improved clinch knot is a good one, and one advantage is that it takes very little line to tie it so you don't have to cut off and waste a long tag end. That can be especially important when you're frequently changing flies or lures on a leader. You don't have to replace the tippet as often. Of course, if you're using a full monofilament line on spinning or casting tackle, wasting a few inches of line is no problem.

Although I still use the improved clinch knot for fresh-water fly fishing—no doubt mostly out of habit—I have switched to another knot for attaching hooks and lures when I'm using spinning or casting tackle. I also use it with virtually all saltwater tackle, including some fly fishing leaders. The knot is the uni-knot developed by Vic Dunaway in Florida.

What's so special about the uni-knot? First, when it's properly tied (Fig. 3), its strength is at or near 100 percent of the line strength. Second, it's very easy to tie, and wastes only slightly more line than the improved clinch knot. However, unlike the clinch knot, it can be tightened in such a way as to form a loop which gives some lures such as wobbling minnows an improved action. When a fish strikes, the loop slides down tight against the hook. One

This small brown trout took a Wulff Royal tied on the leader with an improved clinch knot, a favorite knot among fly fishermen.

thing I particularly like about this knot is that once you're familiar with it, you can tie it by "feel," a distinct advantage for night fishing or in low-light conditions.

If you've never tied a uni-knot, look at the illustration and practice it. Then give it a try the next time you go fishing. I suspect you'll find yourself using it more often.

While on the subject of knots, it might be worthwhile to mention a couple of tips. Some experts have suggested that you wet a knot when tying it by either dipping it in the water or moistening it with saliva. The idea is that it will pull tight more smoothly when wet and result in a stronger knot. Some recent tests have failed to show any advantages in knot strength between knots tightened while dry and wet. Even so, I've found that when tying certain knots—especially barrel knots or blood knots which join two ends of line—it makes it easier to seat the knot properly if you moisten it before pulling it tight. It may not result in a stronger knot, but it makes such knots slightly easier to tie.

Another tip you hear from time to time involves using a cigarette, match or lighter to heat the tip of the line next to a completed knot. When you touch a cigarette to the tip of the line, a tiny ball forms on the end of the line, and when it hardens, it's supposed to prevent the knot from pulling out. That's the theory, anyway. Actually, heating the tip of the line is totally unnecessary if you tie a good knot like the uni-knot. Good knots don't slip. Also, tests show that the heat from a cigarette or match so close to the knot actually weakens it.

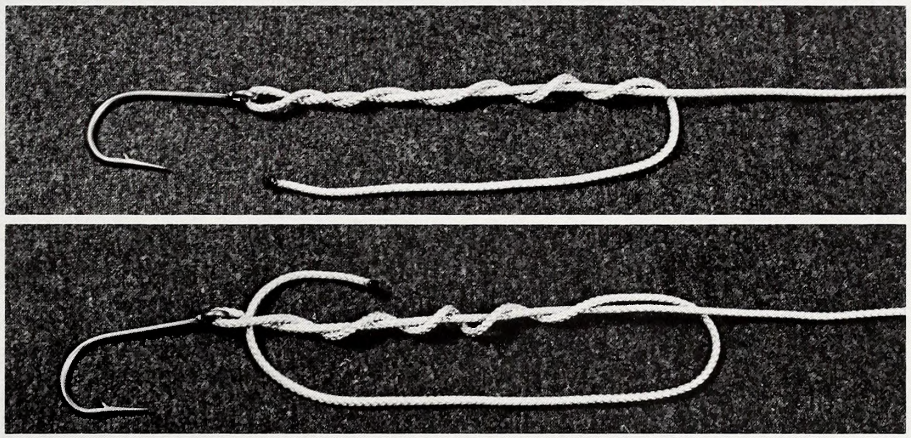
Finally, if learning to tie the uni-knot has whetted your appetite for a more complete education on knots, you might want to check the local library or look in your fishing catalogs and order a copy of "Practical Fishing Knots" by Lefty Kreh and Mark Sosin. Most fishing books contain sections on knot tying, so if you can't find Kreh's book, you may pick up the information you need in one of them.

You may never have occasion to use more than one or two knots in any of your fishing, but then again, you may be poling along a flat fly-fishing for tarpon one day and the guide will say, "We're gonna need a 12-pound test compound leader for these babies."

Think what pride it will bring you to quickly tie a nail knot, a perfection loop, double surgeon's loop, two Bimini-twists, an Albright special and a uni-knot. The guide will be impressed and so will the tarpon if they're still around when you finish. ⊠

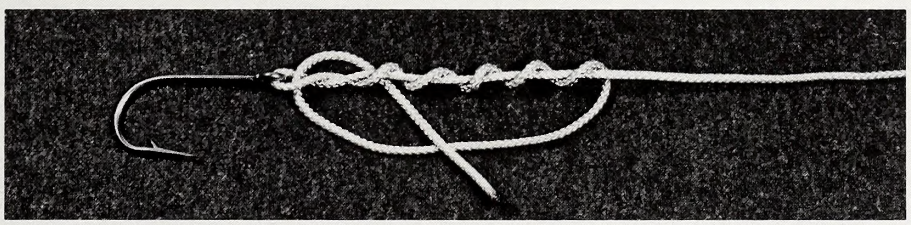
Basic Clinch Knot (Fig. 1)

Thread leader through eye of hook, then take 5 or 6 turns. Insert leader back through loop in front of hook eye; pull knot tight.



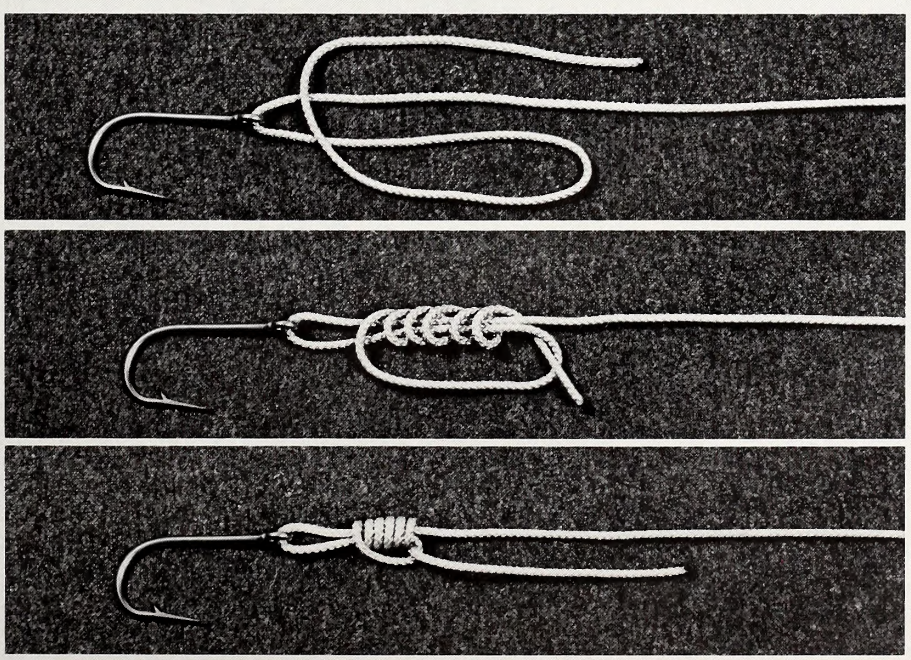
Improved Clinch Knot (Fig. 2)

Tie exactly the same as basic clinch knot, except insert leader back through outer loop; pull knot tight.



100 Percent Uni-Knot (Fig. 3)

Thread leader through eye of hook, then make loop as shown. Wrap leader through loop 5 or 6 times; pull knot tight. Knot can be tightened above eye of hook to form loop which improves the action of some lures. Loop will slide down tightly against eye of hook when fish is hooked.



Ken Taylor

Rambling The Uwharries

North Carolina's Uwharrie Mountains are not as famous or as tall as the Great Smokies, but there is gold-studded history in these Piedmont hills.

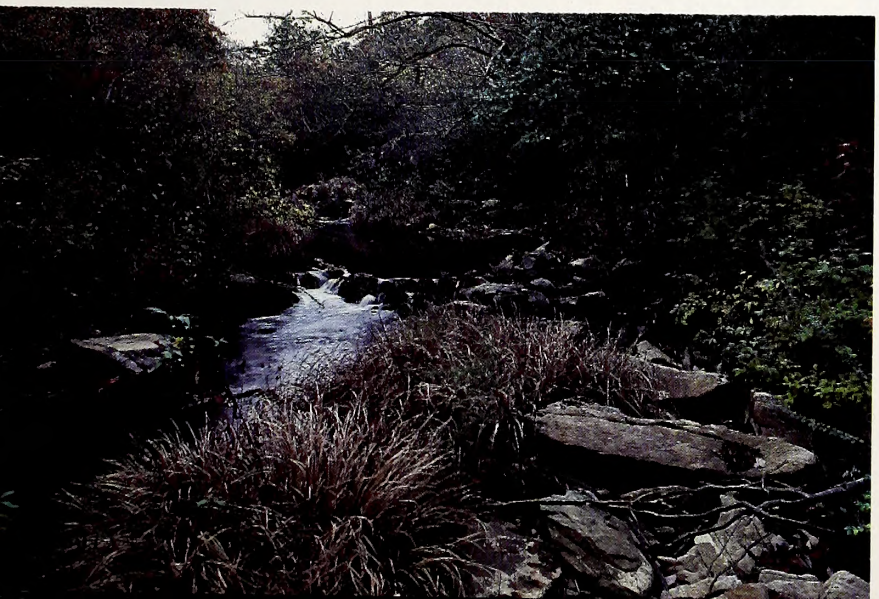
written and photographed
by Jane Rohling

In the heart of the Carolina Piedmont there lie the skeletal remains of one of the oldest mountains on the Eastern Seaboard. The eroded remnants of these ancient mountains now barely reach 1,000 feet into the sky, but they most likely towered a great deal higher. If these aged mountains could talk, they would unveil 500 million years of history, reaching back to their violent volcanic origin, when the sea floor ruptured and spewed forth wave after wave of molten lava, until new islands rose above the waters. In time the earth became still, and the wind and water began the tedious task of wearing down what the volcanoes had built up.

The worn remains of these ancient mountains are known as the Uwharries today. Most people believe the name was given to the area by one of the many Indian tribes that lived here, but its meaning is not known. In 1701 John Lawson forded a river called "Heighwaree" near present-day Asheboro, a good source for mill stones, he said. In the middle 1700s, European settlers used these stones to help them build their new lives. Many of their descendants remain in Randolph, Montgomery and stanly counties to this day, along with a rich heritage of dams, gristmills, covered bridges, old homeplaces and family graveyards. The crumbilin remains of the great Carolina Gold Rush also lie in these mountains.

In March 1983 a new chapter was written in the story of these mountains that has already spanned eons. The U.S. Forest Service announced an administration proposal to sell about 6 million acres of national forest land. Included on the giant auction block were 41,879 acres of the Uwharrie National Forest—nearly 90 percent of the state's newest national forest, established in 1961. The news spread in North Carolina like fire in a dry season, spurring immediate opposition from almost every segment of the

N.C. State Parks



"After following the ridgeline for a while we descended the south side of the mountain. Suddenly, huge monoliths of stone loomed before us."

Five hundred million years of wind and weather have eroded these ancient mountains into the soft swells of landscape known today as the Uwharries (top). Hikers on Dark Mountain (facing page) pass massive boulders of rhyolite, prized by Indians for making arrowheads and tools. Barnes Creek (left) flows beneath Jumping Off Rock.

population. Quietly the proposal sank out of sight. Today most believe the Uwharrie National Forest is safe from large-scale dismemberment.

I became curious about the Uwharries as these events unfolded. During the past year I have traveled through these ancient mountains, talking to the friendly people who live there and learning about the cultural and natural history of the area. I'd like to share my Uwharrie rambles with you, and urge you to experience these mountains for yourself.

April 10, 1983. My first guide in the Uwharries was Bill Donnan, an artist for the State Zoo in nearby Asheboro. Wildlife Commission photographer Kay Frazier was also along. The three of us spent a beautiful April day hiking, and photographing spring in the mountains.

Most of the day was spent hiking a little of the Uwharrie Trail on Dark Mountain, beginning at the parking area on SR 1306 between Flint Ridge and Ophir in north-central Montgomery County. The Uwharrie Trail, which has been designated as a National Recreation Trail, is a marked footpath that follows the crests and ridges of the Uwharries for about 34 miles. It was pioneered in 1968 in Randolph County by Scoutmaster Joe Moffitt and some Asheboro Boy Scouts (see p. 23), but the U.S. Forest Service and many other interested groups have contributed to its development and maintenance.

Driving through the Uwharries it's sometimes hard to tell where the mountains are, but as soon as you start hiking the steep, rocky trail on Dark Mountain you'll know you've found them. The view from the top of Dark Mountain overlooks acres of forests dotted with an occasional small

"The descendants of the early settlers remain in Randolph, Montgomery and Stanly counties to this day, along with a rich heritage of dams, grist-mills, covered bridges, old homeplaces and family graveyards."

Human history competes with nature in the Uwharries. Waves of Irish, French, Germans and English settled in the area in the 18th century leaving evidence of their presence such as the covered bridge near Pisgah and the old cemetery with fieldstone grave markers. Coggins Mine (right) is now a ghost town, but in the early 20th century it was the most important mine in the state, producing gold, lead and zinc.

farmhouse or bright green field. It may not be breathtaking — but it certainly is peaceful.

After following the ridgeline for a while we descended the south side of the mountain, cut cross-country through a valley dotted with wildflowers and began an upward climb again. Suddenly, huge monoliths of stone loomed up before us — jutting straight up out of the hillside. Now I knew why Bill liked this place so well — the rocks in front of us could have served as models for giant rocks he sculpts for the natural habitats at the State Zoo. They are rocks of the Carolina Slate Belt called rhyolite — a very hard, erosion-resistant material that caps nearly all of the higher mountains of the Uwharrie Range, creating formations geologists refer to as "monadnocks."

Leaving the stone giants behind, we returned to SR 1306 just east of our starting point by way of a gravel logging road, which ends near the bridge over Barnes Creek. Jumping-off Rock is just a little farther east and on the other side of SR 1306. The view from jumping-off Rock looking over Barnes Creek is beautiful — both from the top looking down and from the bottom looking up, but I wouldn't recommend jumping off!

September 10-11, 1983. On a pleasant early fall day, Kay Frazier and I set out for the Uwharries accompanied by my two dogs. This time our destination was the Birkhead Mountains in the northern part of the Uwharrie National Forest. This 5,586-acre roadless area is earmarked for wilderness classification in the North Carolina Wilderness Bill, which is, at the time of

this writing, very close to receiving Congressional approval in Washington. According to Julie Moore, a botanist with the state's Natural Heritage Program, the Birkhead Mountains are very important ecologically as an extensive preserve of mature upland hardwood forests, representative of minimally disturbed natural Piedmont habitats.

A hike into the Birkhead section from the south begins near the once-flourishing community of Strieby. We cheerfully started up the trail but quickly decided that early September is still too hot for backpacking. When we reached the North Prong of Hannah's Creek, we waded into the stream and sat down in the cooling water.

Joe Moffitt's book, *An Afternoon Hike Into the Past,* is filled with Uwharrie folklore, and he tells a story of two brothers who died from snakebites on Hannah's Creek. Legend has it that the friendly ghost of one of the brothers roams the mountains still, warning hikers and hunters when poisonous snakes are near. Another story tells of an old prospector who found gold in the area, and in his excitement he headed for the nearest booze hall to celebrate. Unfortunately, when he got over his drunk, he couldn't remember where his strike was, except that it was in a ledge of rock on Hannah's Creek, just north of an old dam. The mother lode has never been found, so keep your gold pan handy and your eyes open.

"In 1799 a Cabarrus County farmer's boy found a 17-pound gold nugget, and the discovery touched off the first gold rush in the United States."

Visitors to the Cotton Patch Mine (top) may not find rock-sized gold nuggets, but the glint of gold flecks in their pans may give them a taste of the excitement felt by prospectors 100 years ago. Royal Dean, owner of the mine, shows a gilded lead brick and its ironic slogan. Friends gave him the brick when he bought the mine in 1983. Slate (above) has also been quarried in spots along Cedar Creek. The blue-gray stone has been used to make flagstones, roofing materials and gravestones.

By the time we reached the Birkhead plantation, 3.3 miles from our starting point, we were beginning to feel the weight of our overstuffed packs. Hiking this section of the trail from south to north involves a lot more uphill hiking than down — a fact we grumbled about Saturday but thanked the Lord for Sunday.

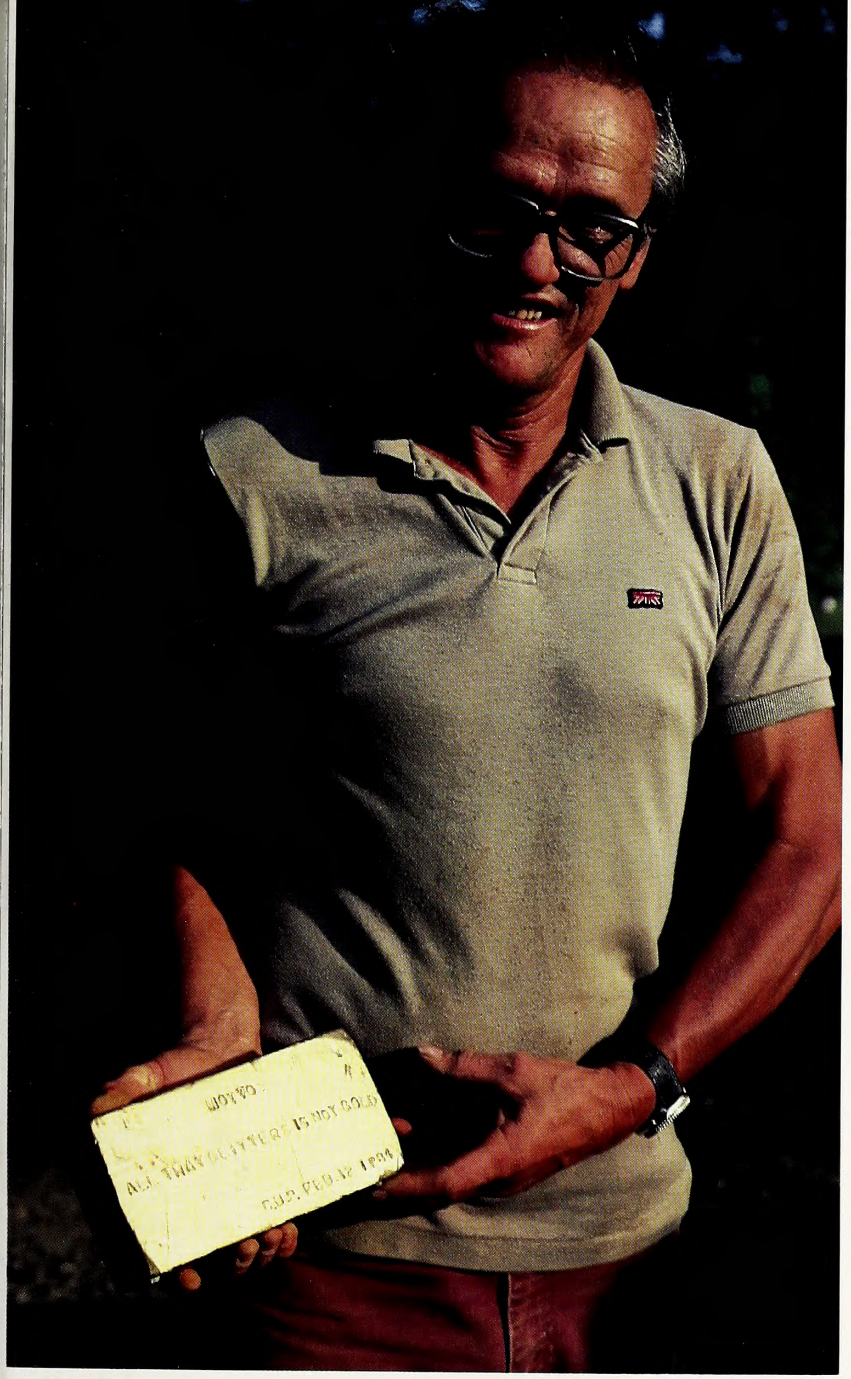
A little farther up the trail, at Fairview on the southern crest of Cooler's Knob, a side trail leads to Rush's Mine and Fern Valley, but we were too tired by then to investigate. According to an Indian legend, the ghosts of five braves and a mysterious white deer roam this valley.

Fairview is listed as a campsite in the trail guide, but "unless you have an affinity for sleeping on rock and steep terrain" Hancock doesn't recommend staying here. We agreed and pushed our weary feet to the next site. Camp #1-B, also called the Joe Moffitt Camp, is located 5.3 miles from our starting point in a valley just off the main trail. And a welcome site it was! After a cool drink of spring water, a gourmet meal and some quiet conversation by the fire, we settled in for the night under clear skies and a canopy of gently swaying trees. Kay was asleep in no time, but before I drifted off I was treated to the eerie sound of two or three screech owls calling to each other from the surrounding hills.

May 26, 1984. My next ramble was to Coggins Mine, a little west of Dark Mountain in northwestern Montgomery County. I was greeted by "Catfish" Spivey and his wife, whose father came to work in Coggins Mine in 1916. Now they watch over the property for its owners. They said it would be all right for me to go in and take a few pictures, but as I left they said, "You know about snakes don't you?" I had worn my boots that day as a precaution, but I was hoping the friendly ghost that warns people when snakes are near was on duty.

Several mines were worked along the Uwharrie River late in the 19th century, and the Coggins Mine, now a ghost town, was once the site of bustling activity. It was the most important mine in the state from 1915 until it was closed in 1926.

In 1799 a Cabarrus County farmer's boy found a 17-pound gold nugget, the first significant record of gold found in America. The boy's father showed the rock to a silversmith who said it was of no value, so it was used in the family's home as a doorstop for three years before its true value was realized. The discovery touched off the first gold rush in America. In his book about the Carolina Gold Rush, Bruce Roberts says, "The miners went up and down



the streams of the Piedmont area with the speed of boll weevils crossing a cotton field, and multiplying just as fast." Most of the excitement of those gold rush years has long since left the Uwharries, but the legends live on, and there are a few places you can still go to pan for gold, although a matchhead-sized nugget is more likely to be found than a 17-pound doorstop. The Cotton Patch Mine, located about 2 miles east of New London in Stanly County, is open to the public for panning.

The present owners of the mine, Royal and Pat Dean, bought it last November. They moved down here from a Chicago suburb, where their friends presented them with a farewell gift of a "gold" brick (made of painted lead) stamped, "All that glitters is not gold." Like that first Carolina gold nugget almost 200 years ago, it will be used as a doorstop.

May 28, 1984. In late May I visited the Town Creek Indian Mound, on a bluff overlooking the Little River near the Montgomery County–Richmond County line. At this site lived a group of Indians related to the Creek Nation of Alabama and Georgia who had immigrated into the area between 1450 and 1500 A.D., driving out the former Siouan inhabitants. The Pee Dee Indians, as the Creeks became known, stayed in the area for

Where To Go In The Uwharries

The Uwharrie Trail—Starting on NC 24/27 10 miles west of Troy the Uwharrie National Recreation Trail goes north for 12 miles, crossing NC 109 6 miles northwest of Troy. It continues north for 8 miles until it hits SR 1306 2 miles east of Ophir. Parking is available at all three trailheads. See Nicholas Hancock, *Guide to the Uwharrie Trail* (Happy Feat Publishing Co., P.O. Box 2821, Asheboro, N.C. 27203. $5.00); Joseph T. Moffitt, *An Afternoon Hike Into The Past* (Joseph T. Moffitt, Box 137, Route 7, Asheboro, N.C. 27203.)

The Uwharrie National Forest—Roughly 50 miles of hiking trails, picnicking facilities, both free and fee camping at Baden Lake. For more information write Uwharrie National Forest, Rt. 1, Box 237, Troy, N.C. 27371, or call (919) 576-6391.

Town Creek Indian Mound—Five miles east of Mt. Gilead on SR 731. Also accessible by SR 73. Group tours are available; slide program; museum. Open daily from 9a.m.-5p.m.; Sunday 1p.m.-5p.m. For more information write Town Creek Indian Mound, Rt. 3, Box 50, Mt. Gilead 27306, or call (919) 439-6802.

Morrow Mountain State Park—Two miles from Albemarle on NC 740. Family vacation cabins, camping facilities, natural history museum, hikes and lectures. For more information write Morrow Mountain State Park, Rt. 5, Box 430, Albemarle, N.C. 28001, or call (704) 982-4402.

"The sweet smell of flowers filled the air and the call of a pileated woodpecker occasionally broke the silence. Dr. Kron must have enjoyed many peaceful evenings like this sitting on his front porch."

Town Creek Indian Mound (above) is an important archaeological site excavated in this century. Settled by Pee Dee Indians on a bluff overlooking the junction of Town Creek and the Little River, the site contains a ceremonial center where a sacred fire burned continuously. House (below) was residence of Dr. Francis J. Kron, first medical doctor in Stanly County. His house is now part of Morrow Mountain State Park.

only 200 years before mysteriously disappearing, leaving behind a ceremonial center that was used by all the clans of the tribe.

Scientific study of the Town Creek Indian Mound began in 1936, and archaeologists have exposed much of the once obscure culture of the Creek Indians. The mound has been excavated and rebuilt, the major temple and minor temple or priests' dwelling and one of the thatched-roof burial huts have been reconstructed. The site is now a State Historic Site, open to the public at scheduled hours.

By the time I was ready to leave Town Creek, a light drizzle had turned into a downpour and threatening sounds of thunder could be heard to the west. I had planned to canoe the Uwharrie River that afternoon, but decided to change my plans and do my rambling by car. From Town Creek I headed northwest on NC 73, and a few miles beyond Pee Dee I turned north.

A short distance up SR 1150, I discovered an abandoned slate quarry along the banks of Cedar Creek, part of the Volcanic-Sedimentary Sequence of the Carolina Slate Belt. Many millions of years ago, volcanic ash settled into muddy sediments in the bottom of a calm, shallow inland sea, forming bands of light and dark silt and clay materials, which later consolidated under tremendous pressure to form shale and slate. The harder, blue-gray slate has been used extensively in the Uwharrie area for building flagstones and roofing slate — and for gravestones.

Traveling north on NC 109, you will pass a sign for the Uwharrie Wildlife Area, which is managed by the U.S. Forest Service and the N.C. Wildlife Resources Commission primarily for deer. It is a popular area for hunting, fishing, camping, hiking and motorcycle riding. Continuing northward on NC 109, you are treated to a scenic vista. Several peaks of the ancient Uwharrie can be seen to the east across an open field.

It wasn't getting any earlier, and I still wanted to make it to the Morrow Mountain State Park, so I got back in the car and headed north and then west, then south around Badin Lake, devouring an ice cream bar for dinner on the way. Driving up Morrow Mountain I finally had the feeling I was really in the mountains. The road is steep and winding and even has a hairpin turn. This is among the highest peaks in the Uwharrie range, reaching 938 feet above sea level and offering fine vistas in several directions. The top of the mountain is littered with millions of slivers of rhyolite, left by the Indians who mined the rock here for tools and weapons.

The park offers a variety of visitor attractions and services, including interpretive facilities, family and group camping, picnicking, boat rentals, a swimming pool and hiking and bridle trails. One of the park's most notable features is the reconstructed homeplace of Dr. Francis J. Kron, the first educated medical doctor in Stanly County. He practiced here from 1834 until his death in 1883, often traveling all day on horseback to treat one patient and charging only $1 per call plus mileage. As his own health declined with age, the doctor continued to treat patients. He made sick calls in his wagon, lying on a feather mattress, with a servant doing the driving.

In addition to practicing medicine, Dr. Kron conducted many horticultural experiments, and the Kron homeplace was a showplace of many types of flowers, fruit trees, vines and shrubs. A very large old magnolia tree and several tall cedars grace the property today, along with a variety of fruit and nut trees.

On this Memorial Day evening, 100 years after Dr. Kron's passing, I was alone with the memory of one of the most highly regarded settlers of Stanly County. The sweet smell of flowers filled the air and the call of a pileated woodpecker occasionally broke the silence. Dr. Kron must have enjoyed many peaceful evenings like this sitting on his front porch. The only thing missing was the distant sound of water tumbling over the great falls of the Yadkin River which the Doctor could hear from a mile away — the falls passed away soon after the doctor himself.

The days I have spent rambling around the Uwharries have been filled with a sense of appreciation for the rich natural and cultural history of these tired old mountains. There's a lot more to see, a lot more to learn, and I plan to return often. There's something here for everyone to enjoy and plenty of people working hard to preserve this part of North Carolina's heritage for the generations that follow us. ⊠

The Uwharrie Trailblazer

Laurence S. Earley

Asheboro scoutmaster Joe Moffitt pioneered the Uwharrie Trail with his Boy Scouts, and in the process he taught them about history, wildlife and self-sufficiency in the woods.

Interview by Lawrence S. Earley

I was a scout master of Troop 570 in Asheboro and we were sending scouts up along the Appalachian Trail to get their 50-mile hikes for Eagle Scout projects. Unfortunately a few got lost sometimes. So I decided, we have all these woods, why not make us a trail where we wouldn't get lost. I went out and started checking it out in 1968 and I asked each person who owned the land where I wanted to go if they minded if we crossed their property with a scout trail. It took from '68 to '70 to get it lined up to where we knew we could go all the way.

Laying out the Uwharrie Trail was a joint effort between the scout troop and myself. We made the trail go down some old roadways. Down over the Birkhead Range there's an old road that was one time the stagecoach trail between Salisbury and Fayetteville—that was 100 years ago or so. We followed that for historical reasons partly, and partly because of a lot of old house sites along the trail.

When we found an old house site my scout troop and I would do some research. Quite often I took them up to Asheboro to the Register of Deeds. We'd find out who owned it and start tracing it back. We would run it back as far as we could find anybody and quite often we went plumb back to the 1700s. At each site if there were any old fruit trees we would try to fix them up and help them live. If there was a spring we'd always clean it out in case we needed to come by there. We'd check the water, see if it was good, leave it open for the game to have some water during the dry spells. And we'd build a campsite where amateurs could build a fire safely.

Well, it took about three and a half or four years to get it really off the ground. In our troop there were 50 kids over that time. We had 15 or 16 who stayed in it from start to finish, and then a lot—like you have in all scout troops—coming and going. It was in 1971 that we built the first campsite.

I think this was a learning process as much as a trail-blazing process. I taught my scouts what each tree in the forest was and what it was used for, and all about herbs. And they gained a little knowledge about how to do things. That's what scouting is all about. You try to teach kids how to do things on their own. And if somebody just hands it to them, it doesn't mean a whole lot.

You have to use your imagination with a bunch of kids. I have been out with a scout troop and if things get dull you invent things. Once I divided the troop into two bunches and said, "Alright, this bunch go out over there." I marked off a little place and said, "All right now you put something that's not natural on these trees. Put 10 things there and this other group will go find them while you hide another bunch." For example, they might put a maple leaf on an oak tree.

You'd be surprised how many people learn what kind of leaves there are. It was a learning game, but it was a lot of fun. You keep everybody moving and everybody happy. Then when you all get through eating you haul off and take a hike over the mountain in the moonlight and when you come back you go to bed.

It's a lot of fun but you have to know how to do it. You explain why you're doing something and why something else is unsafe. Then pretty soon those same kids will be teaching somebody else, and you'll have a pretty smart troop.

The Uwharrie Trail is easy hiking, mostly. You can get on some peaks back on the Birkhead Range at Fairview or close to Dark Mountain and there's scenery that's as good as any you can see up on the Appalachian Trail. You get up on Dark Mountain late some evening when the sun is going down and it's just hard to beat. It's beautiful. If you really want a treat, go camp back there some night when the moon is full and there's snow on the ground. There's no picture can beat that. ⊠

Carolina Profile *is a periodic feature in* Wildlife in North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.*

Fishing Small Streams

by Mark Taylor

Kay Frazier

There are big surprises in store for fishermen who fish North Carolina's neglected small streams.

The eddy looked inviting. Cool green water rushed by in the main channel forming a deep, swirling pool along the bank. I tossed a Beetle Spin into its depths expecting to catch a small bream. Instead, I was surprised by a quick, hard strike. My ultralight rod bent almost double, and I coaxed the fish out from under the brush and walked it downstream into a large pool. The fish made several runs before I brought it to net and found I had a largemouth bass about 15 inches long. The fish was long and slender, and its pale silver sides gleamed in the sun. I held the fish gently while I removed the spinner, weighing my desire for a fish dinner against admiration for its gleaming hide. Admiration won, and I slipped the fish unharmed back into the water. The day was young; there would be other fish for the frying pan.

As it turned out, there were other fish. A bewhiskered 2-pound channel cat bit in a deep pool. And there were robin in the shallow runs, and chain pickerel, bluegills and a few less common species in the long stretches of slack water.

That's the great thing about fishing small streams and rivers — you never know what you'll catch. There are literally hundreds, and probably thousands, of small streams in North Carolina from the foothills through the Coastal Plain. Most of these streams offer excellent fishing for a variety of species, and a bonus is that you'll seldom encounter another angler.

Equipment and techniques. My personal choice for fishing small streams is ultralight spinning tackle, although a medium-weight bait-casting or spinning rod comes in handy for fishing deep pools with larger lures, plastic worms or with natural bait. However, most of the fish in small streams are small — bream weighing a half-pound or so at most or bass or channel catfish running up to 2 pounds. These fish generally prefer small baits, and an ultralight rod and reel rigged with 4-pound test line is just the ticket for tossing small spinners and plugs.

You can also fly fish many of these streams, and most of the species which will strike a lure will also take a small popping bug or sinking fly. Most trout flies will also work. A fly rod 7½- to 8-feet which balances with a size 5- or 6-weight floating line is a good choice. A leader about 7-feet long with a 6-pound test tippet is fine.

There are two techniques for fishing small streams. One is to float the stream with a small johnboat or canoe, and the other is to wade. If you decide to float fish, choose the water carefully. Many small streams are choked with blowdowns, and floating these waters can be frustrating. However, using a canoe or boat allows you to fish deep pools effectively. When you encounter a shallow rapid, beach the canoe on a sandbar and then fish the run and pool below before going on. On a stream without too many blowdowns, floating is a pleasant and effective way to fish.

On really small streams, wading is the best option. Fish these waters as you would a trout stream — wading upstream and casting into the small eddies, pools and riffles. In early spring and summer, you may want to wear waders — the water stays surprisingly cold. A pair of felt-soled wading shoes are indispensible for keeping your footing on slippery, rock-covered bottoms. Polarized sunglasses are also a big help in spotting fish and wading safely.

Robin. The small blackwater streams of the Coastal Plain are best known for their excellent "robin" fishing. The robin, or redbreast sunfish, reaches weights of about a pound, puts up a strong fight, and is excellent table fare.

Serious robin fishermen often use special fiberglass poles, called "bream busters," that run from 11 to 12 feet in length. These poles are rigged with monofilament line about the same length as the pole, and a small sliding cork, split shot and wire hook. The limber poles are used to flip a cricket,

Panfish like this pumpkinseed (above) are common fish in small streams, and an afternoon's outing almost always yields enough for a fish fry. The Beetle Spin is a favorite of many anglers who fish small streams.

"The fast, erratic retrieve favored for bass is not effective for jack."

earthworm or catalpa worm under the shoreline vegetation, especially where there is current. Robin will also hit small spinners.

Bluegills. Though normally associated with farm ponds, bluegills are also found in many streams, but unlike robin, they prefer slower, deeper portions of the stream. Stream bluegills also rarely reach the large sizes of those found in farm ponds, but like robin, some may reach a pound or more in the large streams.

My personal choice in lures for these fish in small streams is the Beetle Spin. I like these lures for two reasons — they are almost weedless, and are relatively inexpensive. Although they come in a variety of colors, I stock only black and white. I've found that if fish aren't biting either of these, they probably won't take anything else either.

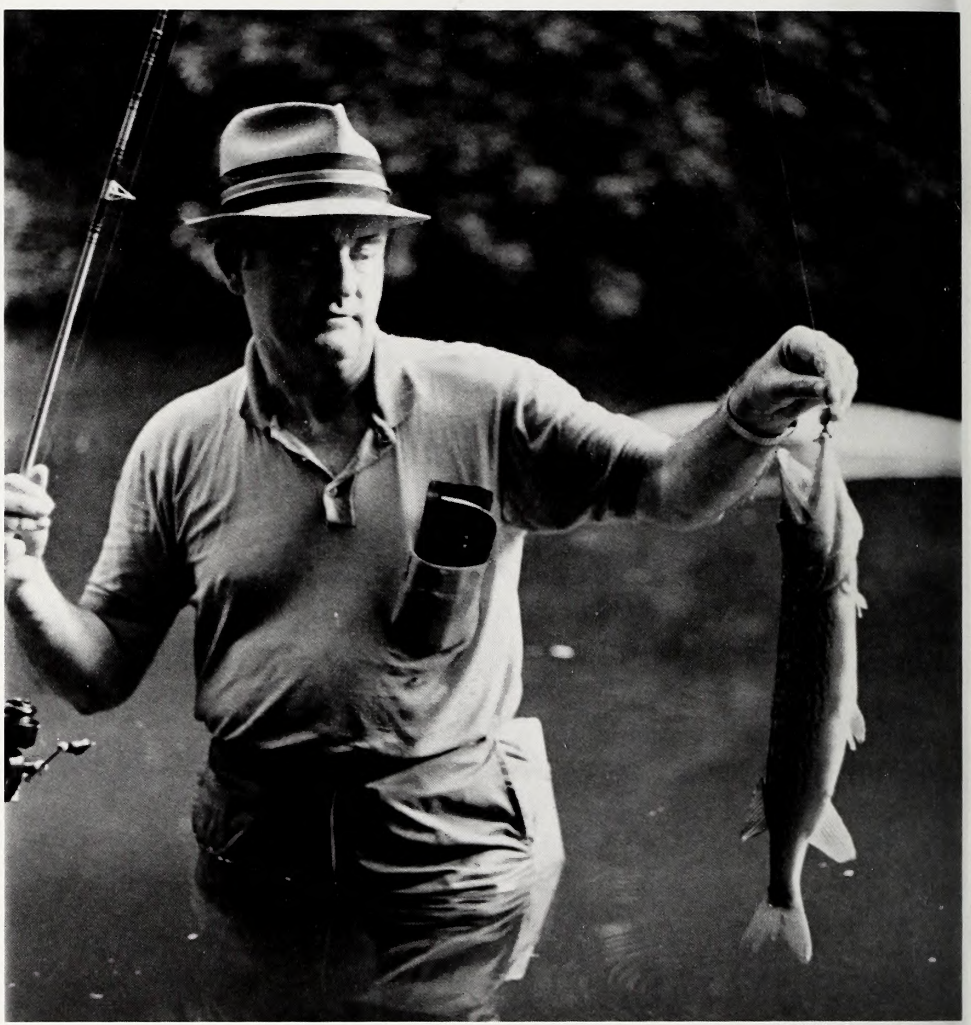
Largemouth bass. Largemouth bass are a bonus in many small streams. Most of the fish average 10 to 12 inches, but occasionally a 2- to 3-pounder will give you a surprise. These fish are generally found in still pools, especially near stumps and downed logs. However, the quiet backwaters off rapids shouldn't be ignored. You'd be surprised at how often you'll pull a bass out of a side channel that is little more than a puddle.

Chain pickerel. My favorite prey in small streams, however, is the "jack" or chain pickerel. These fish are found throughout the blackwater streams of the Coastal Plain, and haunt the long, still stretches of slack water found in many Piedmont streams.

Normally, I fish almost solely with a Beetle Spin, but when I come to a likely looking stretch of pickerel water I may switch to small lures such as the Rebel or Rapala. Small spinners such as the Mepps and Panther Martin also work well.

Downed logs, stumps, and the edge of weed beds that border deep water are all spots where a jack may be waiting in ambush. When you fish for jack, change your style. The fast, erratic retrieve favored for bass is not particularly effective for jack. These fish lie in wait for their prey, and often capture it with a single lunge. With their torpedo-like bodies, jack are very quick but are not especially maneuverable. Consequently, it's best to maintain a steady, slow to medium-speed retrieve. Also, continue fishing your lure until the bitter end. Jack will often follow a lure for some distance before striking, and it's not unusual for them to strike as the lure is lifted from the water. Persistence also pays. A jack that has struck and missed a lure can often be enticed into another hit.

There are also some local populations of other game fish in some small streams — including white bass in the Uwharrie Mountains, Roanoke bass in the Piedmont, and spotted bass in several Coastal Plain streams. You also may encounter an assortment of other species, including crappie, pumpkinseeds, yellow perch, fliers, green sunfish and others in some streams. The variety can be amazing, especially in coastal streams.



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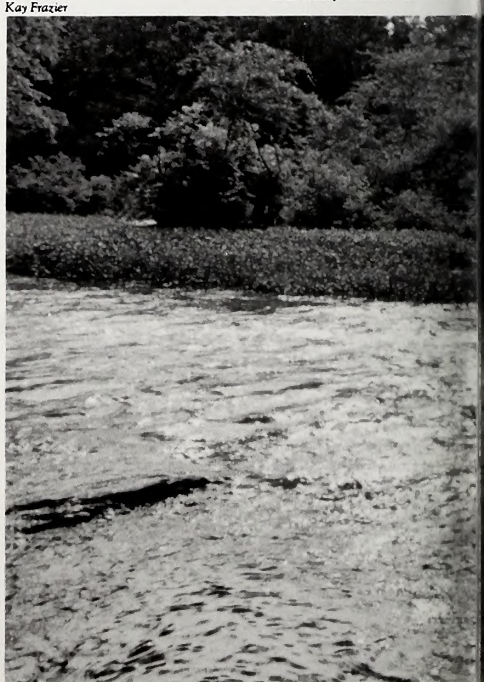


Kay Frazier

Chain pickerel or jack (above) haunt the long stretches of slack water in many Piedmont and coastal streams. These fish put up an excellent fight, and small spinners — such as a Mepps or Panther Martin — are preferred lures.

Kay Frazier

Several rock-strewn rivers (left) that drain to the Neuse River system in the Piedmont offer fishing for the Roanoke Bass. These fish may well be the world's rarest bass. Ultralight spinning tackle (bottom) is the best choice for fishing small streams. Although large fish are occasionally caught, most are small—and ultralight makes them a sporting proposition.

White bass. Two streams in the Uwharries offer excellent fishing for white bass during spawning runs. They are the Uwharrie River, which runs into Lake Tillery, and Dutchman's Creek which feeds Lake Wylie. The spawning runs begin in late April and peak in May. Favored lures include small white and yellow jigs and spinners. These should be fished slowly near bottom, and casting across the riffles below pools will also produce fish.

Roanoke bass. The Roanoke bass is found in a handful of rivers in the Neuse-Tar drainage in the Piedmont. Commonly called "redeye" because of their blood red eyes, their dark-striped, green-bronze coloration makes them a memorable catch. The fish require good water quality, and are commonly found around boulders and ledges in large pools. Small spinners seem to be the preferred lure, and I suspect that a red and white streamer fly would also be effective.

Spotted bass. Spotted bass, which closely resemble largemouth bass, are native to our mountain rivers that flow west to the Mississippi drainage, but they have been introduced into several rivers in the Coastal Plain—including upper and lower Little River, Parkers Creek and Advents Creek in Harnett, Cumberland and Moore counties. These cool, swift rivers feed the Cape Fear River, and are similar to many mountain streams. Biologists found that a top-level predatory game fish was absent in these waters, and hoped that the spotted bass would fill this niche. Consequently, about 300,000 spotted bass were stocked in these waters several years ago, and biologists are currently sampling the waters for signs of reproduction. Once again, fishing small spinners in the runs and pools is effective.

So if it's good fishing you want, try one of the many streams that are flowing probably not too far from your front door. One more thing—walking or canoeing a stream from pool to riffle is as soul satisfying an activity as you can find on a summer's day. You'll often be alone, and besides the sound of the stream and the occasional hammering of a woodpecker, or rattling of a kingfisher, the only interruptions will be those provided by willing fish. ⊠

Thanks to Nongame Tax Checkoff

Falcons And Eagles Soar Over Carolina

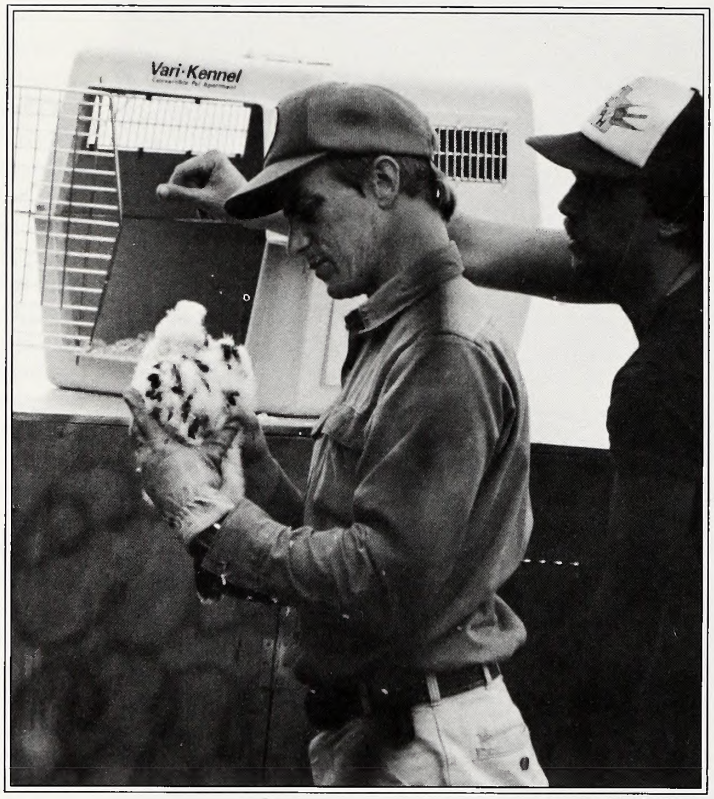
Written and Edited by Mark Taylor

Endangered peregrine falcons and bald eagles are once again soaring over North Carolina, thanks to the Nongame Wildlife Tax Checkoff. Enacted by the 1983 N.C. General Assembly, this program allows citizens to contribute a portion or all of the refund from their state income tax for management of nongame and endangered wildlife.

"We released four young peregrine falcons at Grandfather Mountain in late May as the first step in an effort to restore populations of this endangered species to the Southeast," said Melinda Welton, endangered species project leader for the N.C. Wildlife Resources Commission. "These birds were obtained from a captive-breeding program run by The Peregrine Fund, a nonprofit organization at Cornell University. At this facility, falcons that are injured and are unable to survive in the wild are used to produce chicks for restoration projects."

The young birds — two females and two males — were placed on a high, exposed crag. The birds were fed dead chickens by hidden attendants, preventing the birds from learning to associate food with man. Gradually, the birds lost interest in this food as they learned to fly and hunt on their own. Several weeks later, the birds left the release site.

"Young falcons often range for thousands of miles — anywhere from the northern United States to Central America," said Welton. "After the birds reach sexual maturity in two to four years, they will hopefully return to the North Carolina mountains to nest. We plan to add another release site next year, which may be in Jackson County, and hope to have four to five sites in 1986. The restoration program in North Carolina should be completed in five years."



John Widman

Return of a Native: *Four peregrine falcons were recently released on Grandfather Mountain by the N.C. Wildlife Resources Commission as part of an effort to restore this endangered species to the Southeast. The project is being funded by the North Carolina Nongame Wildlife Tax Checkoff, which was recently enacted by the General Assembly.*

The Peregrine Fund, Grandfather Mountain, U.S. Fish and Wildlife Service, Tennessee Valley Authority, and the N.C. Wildlife Resources Commission were all involved in the restoration project.

At the opposite end of the state, a second release of bald eagles was made at the Lake Mattamuskeet National Wildlife Refuge in Hyde County. Last year two birds were released at the refuge, and this year four birds were released from the same location. Two of the young birds were from Maryland, one was from Virginia, and the other was obtained from the U.S. Fish and Wildlife Service Patuxent Wildlife Research Laboratory in Maryland. With the exception of the Patuxent bird, all of the fledglings came from wild nests on Chesapeake Bay.

"The fledglings from Chesapeake Bay were all third chicks in 'three-chick' nests," said Welton. "Bald eagles normally lay only two eggs, and survival rates for all chicks in three-chick nests tend to be low. Consequently, the removal of a chick from these nests may improve survival rates for all the birds. Using birds from Chesapeake Bay is also a good idea because they're similar to coastal North Carolina eagles in habits, genetics and breeding times."

Like peregrine falcons, young eagles literally wander the entire country after they are released. In four to five years, however, the birds should return to the Lake Mattamuskeet area to nest. The fate of the two birds released last year is unknown, but since both birds were tagged biologists assume they have survived.

Biologists hope to release as many as a dozen bald eagles at Lake Mattamuskeet next year, and are also developing a comprehensive recovery plan for bald eagles in North Carolina. "This plan will include an evaluation of the potential bald eagle habitat, and an estimate of the population that the state could support. At one time there were probably 30 to 40 bald eagles nesting in coastal North Carolina, but we don't know how many birds the state could currently support. Several inland reservoirs — including Jordan, Falls-of-the-Neuse, and Kerr lakes — now serving as wintering habitat for bald eagles could offer suitable nesting sites in the future.

"We also plan to conduct a yearly nesting survey of eagles. This year, we had our first successful nesting attempt since 1971. A bald eagle fledged two young in Hyde County."

The bald eagle project is a cooperative effort of the U.S. Fish and Wildlife Service, Lake Mattamuskeet National Wildlife Refuge, and the N.C. Wildlife Resources Commission.

On Lake Tillery

Boating Hit And Run Solved

Money talks! That old saying once again proved true recently when a sizeable reward brought forth an informant whose help resulted in the conviction of three men in a serious hit-and-run boating accident case.

The accident occurred last August on Lake Tillery and resulted in serious injury to Cresful Horn of Marshville. Witnesses, including Horn's son, provided accurate descriptions of the offending boat and its occupants. In the confusion following the collision, however, no one was able to obtain the registration number of the boat before it fled the scene. An intensive search by wildlife enforcement officers and sheriff's deputies of Stanly County, and an air search paid for by the victim's son failed to turn up the boat.

During the first two weeks of the investigation, Crimestoppers in Stanly County offered $1,000 for information leading to an arrest in the case, and several businesses in Marshville provided an additional $5,000 in reward money. The rewards were widely publicized, and officials got the break they needed during the third week of the investigation when an informant provided information that allowed officials to locate the boat, its operator, and its four occupants at the time of the accident.

The operator of the boat was charged with negligent operation of a motorboat and failure to provide his name and boat number following a boating accident. He was found guilty of all charges, and ordered to pay a fine of $400 plus the $93 cost of court. In addition, he was also ordered to pay a restitution of $4,000 to Horn, and was ordered not to operate a boat for two years. Two of the occupants of the boat were found guilty of aiding and abetting the operator, and both were fined $50 plus a $35 cost of court.

"Over 400 man hours were spent on this case by wildlife enforcement officers and other enforcement personnel," said Lieutenant Robert Patrick of the Wildlife Commission's Division of Enforcement. "Reckless operation of a boat can result in serious injury or even death, and we take these cases very seriously."

Careless or reckless operation of a boat and operating a boat under the influence of alcohol are illegal. These violations should be reported to a local wildlife enforcement officer (include a description of the boat and its registration number) or to the Wildlife Commission's 24-hour, toll-free Wildlife Watch Hotline at 1-800-662-7137.

— Terry Shankle

Study Seeks Answers

South Shortchanged On Geese?

Are large numbers of Canada geese that would normally winter in North Carolina falling to the gun in early goose seasons on the Delmarva peninsula? Biologists think so, and last year they began banding birds throughout the Atlantic Flyway in a cooperative effort to learn more about the seasonal movements of geese.

"We put neck collars on 494 Canada geese in North Carolina last year as part of this study," said Dennis Luszcz, waterfowl biologist for the N.C. Wildlife Resources Commission. "All told, 7,634 Canada geese were banded in New York, Pennsylvania, New Jersey, Delaware, Virginia and North and South Carolina. Over the next three to four years, we hope to band a total of 50,000 Canada geese throughout the flyway."

During the last two years of the study, trained observers will record band data. Multiple observations over several years will provide detailed information on the movements, behavior and survival of geese. This information may yield solutions to the problem of "shortstopping" of geese in northern states. Changes in agricultural practices have prompted birds to winter farther north — particularly on the Delmarva peninsula of Delaware, Maryland and Virginia. As resident flocks were established in these areas, fewer birds migrated south to traditional wintering grounds in coastal North and South Carolina. Despite a steady increase in the numbers of Canada geese in the Atlantic flyway over the past 30 years, the number of birds wintering in North Carolina has fallen. For example, a high of approximately one-quarter of a million geese wintered here in 1944. By the early 1980s, this figure had fallen to about 30,000 birds.

"Canada geese have certainly changed their habits over the past 30 years," said Luszcz. "However, we don't feel that this is the whole story. Several years ago, states in the Delmarva peninsula began opening goose seasons earlier and bag limits were increased. Based on banding data, we feel that Canada geese which normally winter in North Carolina may be arriving at the Delmarva peninsula when these seasons open. Since harvest is heaviest early in the season — the birds quickly become wary — a disproportionate number of birds that would normally winter in North and South Carolina may be harvested in these early seasons. We don't have enough data to prove this yet, and this program will attempt to answer this question. If our banding shows this is the case, changes in regulations throughout the flyway could result in a more equitable distribution of birds."

In Brunswick County

Deer Case Nets High Fines

Sometimes you get more than you bargained for. Two Brunswick County men learned this much to their chagrin recently when they were arrested for firelighting two doe deer by wildlife enforcement officers Milton McLean and Charles Haynes. When Master Officer McLean skinned and gutted the deer looking for bullets, he found three fetuses in the does. He preserved them in formaldehyde, and presented them as evidence in court. In addition to being found guilty of all charges, the men were assessed wildlife replacement costs for five deer — two adults and the three unborn fetuses. Total costs of replacement alone was $1,400 — or $280 per animal.

"This is the first time that wildlife replacement costs have been assessed for pregnant animals," said Colonel Winfield Rhyne, chief of the Commission's Division of Enforcement. "When you add replacement costs to fines and confiscation of equipment, poachers can pay a stiff price for their fines. We're glad to see that the courts are treating wildlife violations seriously."

Over 590 Students Participate

Eighty Schools Enter Hunter-Safety Tournament

Over 80 schools from across the state sent teams to the sixth annual Hunter Safety Shooting Tournament held in Kinston recently. The event is sponsored by the N.C. Wildlife Resources Commission, and is designed to promote hunter safety and recreational shooting.

"Over 590 students participated in this year's tournament," said Lieutenant Wilton Pate, Commission safety officer from Ayden and director of the tournament. "These students competed in three events—trap shooting, small-bore rifle shooting and archery. All participants must be part of a school team and have completed a Commission sponsored hunter safety course. We're very pleased with the turnout we had for this year's tournament, and consider the event a great success."

The overall school champion for the third straight year was Ledford Senior High School from Thomasville. Finishing second was Southern High School in Graham, and Surry Central High in Dobson placed third.

Ken Taylor

Quite A Turnout: *Over 590 students from across the state participated in the recent sixth annual Hunter Safety Shooting Tournament, sponsored by the N.C. Wildlife Resources Commission. Ledford Senior High School in Thomasville was the overall champion.*

In trap shooting West Carteret High School in Morehead City finished first, Coats High School of Coats finished second, and Southern High School of Graham finished third. A total of 22 shooters shot perfect scores in trap.

Ledford Senior High School finished first in small-bore rifle shooting followed by West Forsyth Senior High School in Clemmons and John A. Holmes School in Edenton.

In archery Ledford Senior High School finished first, Southern High School finished second, and Hobbton High School of Newton Grove finished third.

The individual winner overall was Samuel Hall of Forbush High School in East Bend. Individual winners in each event include Jeff Tate of Ledford Senior High School in trap and rifle shooting and Jimmy Gregory of Forbush High School in archery.

"We've seen definite improvements in the skills of the competitors since the tournament began in 1979," said Pate. "For example, the winning score in the first tournament would have placed only 47th this year. The students take this tournament very seriously.

"I would also like to thank all the volunteers and businesses which donated time and prizes to the tournament. Without their help, we could not run this event."

Few Reach Adulthood

Bass Short Lived

What are the odds of a newly hatched largemouth bass living to adulthood? They're slim, according to fisheries biologists.

A female largemouth bass usually lays 5,000 to 20,000 eggs. Several weeks after the eggs have hatched, the male largemouth bass—which has zealously guarded the nest from predators—will often swim through the newly hatched fry, devouring many of them. Biologists estimate that only 10 to 40 of the original 5,000 bass will live to be one-year old.

Shish Kebab Great For The Dog Days

A toasty kitchen with its spicy aromas and mouthwatering dishes has a tantalizing appeal in January when icicles hang from the window sills. In August, however, the kitchen's charm is diminished. The less time spent there the better.

Like many other North Carolinians, much of my cooking is done on a patio grill in the dog days of summer. Hamburgers, hot dogs, steaks, spare ribs and the like are all standard fare, but occasionally I like to grill some wild game taken the previous fall. Venison, duck, goose (if I was lucky), doves, quail and other wild game are all excellent when charcoal grilled. One of my favorites, though, is shish kebabs of duck or goose. This dish is different, easy to prepare, and is mouthwateringly delicious.

Waterfowl Kebab

breast of duck or goose, filleted
Italian dressing
pearl onions
green pepper
cherry tomatoes
pineapple chunks
other fruits or vegetables of choice

Cut the duck or goose breast fillets into 1½ to 2-inch cubes and marinate for 15 to 45 minutes in Italian dressing (any Italian dressing may be used, but I prefer the packaged spices that you mix yourself—be sure to prepare far enough in advance for the spices to blend).

Alternate chunks of duck or goose on the skewers with pearl onions, chunks of green pepper, cherry tomatoes, mushrooms, pineapple and other fruits and vegetables. Place the skewers on the grill close to the coals. If you don't have skewers, straightened coat hangers with the paint or varnish burned off work well.

Cook the kebabs to the point where you would normally cook a prime steak. I like mine medium to medium-rare, and be careful not to overcook. Serve with a baked potato, fresh-buttered corn, a favorite salad, and lean back and enjoy the sounds of a summer night.

—*Curtis Wooten*

They Shoot Fish, Don't They?

Try Bowfishing For A Change Of Pace This Summer

When the summer sun is high in the sky, fish skulk along the bottom and often show little interest in even the most delectable baits or lures. Many anglers head for the shore during these doldrums only to be entrapped into such thrilling household chores as mowing the lawn or mending the old home place. There is an alternative to this drudgery, however. Go fishing — with a bow and arrow.

Bowfishing is an exciting way to spend a day, and North Carolina anglers may legally take nongame fish — including carp, bowfin, and suckers — with a bow. (It is illegal to take game fish with a bow and arrow). Bowfishermen must also have a special-device fishing license or a sportsman's license.

In addition to basic archery equipment, bowfishermen need polarized sunglasses, a solid fiberglass fishing arrow equipped with a barbed head, and a bow reel loaded with at least 50 feet of 90-pound test nylon line. The reel should be mounted near the handle of the bow, but should not interfere with shooting. Attach the line to the arrow by running it through a hole in the arrow just behind the nock and tie it to the arrowhead behind the barb. This allows the line to stabilize the arrow in flight.

Spring and summer are the most productive times to bowfish for carp. The fish are often found in shallow, backwater coves and can be stalked easily to within about 20 feet. Even at such close ranges, misses are common. Light is refracted by water, and the fish appear to be closer to the surface than they really are. Consequently, archers must shoot below the fish to be successful.

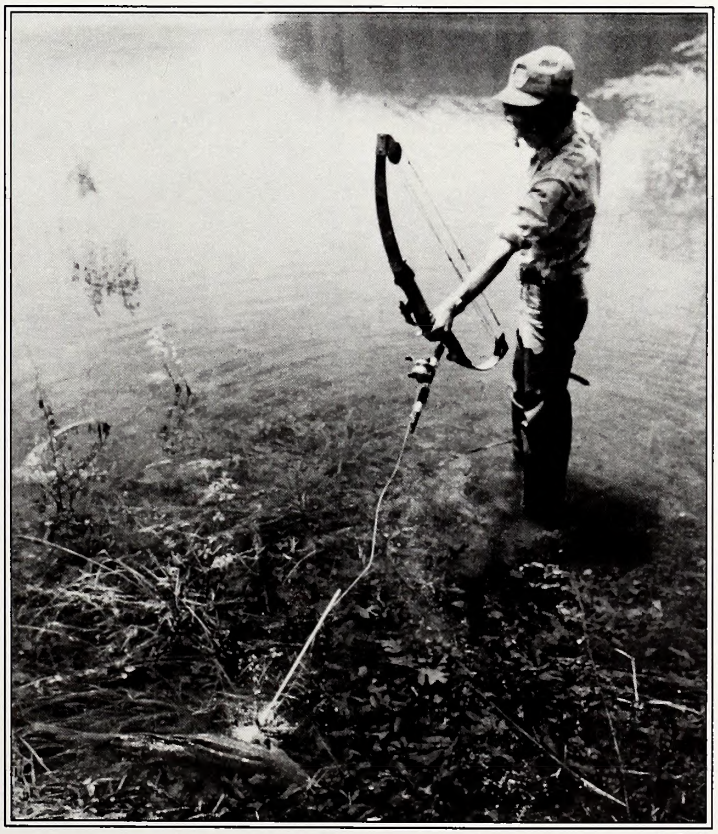
What do bowfishermen do with their catches? Carp and suckers are tasty table fare when pickled, smoked, or prepared in any number of ways. Carp caught from clean water also lack the muddy taste that is often associated with this fish. In fact, although the flesh of carp is coarse, these fish were favored by the royalty of Europe in medieval times, and are still popular in Europe and Asia today. The following recipe for carp casserole may well change your opinion of this fish!

Carp Casserole

2 cups flaked, cooked carp
2 cups cooked rice
¾ cup chopped onion
¼ cup diced green pepper
2 tablespoons butter
1 can cream of celery soup
½ cup milk
½ to 1 cup bread or cracker crumbs

Flake fish. Cook onion and green pepper in butter until tender. Add fish and rice, mix lightly. Blend soup and milk. Coat the bottom of a well-greased, two-quart casserole dish with crumbs. Cover with alternating layers of fish and soup mixture. Top with remaining crumbs. Bake in moderate oven at 350° for 20 to 30 minutes.

— Jay Davies



Jay Davies

An Exacting Sport: *Bowfishing for carp requires skill and patience. This bowfisherman was participating in the Georgia Mountain Fair Carp Rodeo held on Lake Chatuga near Murphy. Although carp are held in low esteem by many, they are strong fighters and taste good.*

Boaters Need Sunglasses

Sea Hard On Eyes

If you spend a lot of time boating on salt water, a good pair of sunglasses is one of the best investments you'll ever make. Prolonged exposure to bright sun and salt water can result in pterygiums, an eye affliction commonly found among serious saltwater sailers.

The U.S. Olympic Yachting Committee reports that pterygiums are fleshy, benign growths found on the surface of the eyes. They can impair eyesight, but the major effects range from scratchy "sand in the eyes" discomfort to disabling pain. The growths are caused by a combination of saltwater abrasion and ultraviolet damage to the eye. Pterygiums are not a problem among fresh water sailers.

Damage from this affliction is permanent, and the best cure is prevention. Pterygiums can be removed surgically, but usually reappear within several years. Wearing a good pair of sunglasses — and a hat with a brim — will prevent the disease. Be sure that the sunglasses are not simply dark lenses, but have the capacity to absorb ultraviolet light. If your eyes become scratchy and sore while boating on salt water and you suspect you may have pterygiums, consult an optometrist for a diagnosis.

Calendar Of Events

August 1-4
Mineral and Gem Festival at the Harris Middle School in Spruce Pine. For more information contact the Mitchell County Chamber of Commerce, Spruce Pine, N.C. 28777.

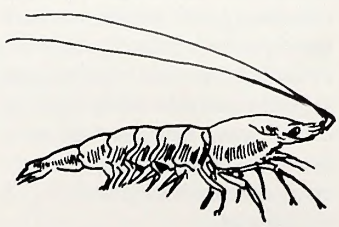
August 2-4
57th annual Mountain Dance and Folk Festival at the Asheville Civic Center. For more information contact the Asheville Chamber of Commerce, P.O. Box 1011, Asheville, N.C. 28802.

August 3-5
Kerr Lake Folk Arts and Crafts Festival in Henderson. For more information contact Kerr Lake Recreation Areas, Rt. 3, Box 800, Henderson, N.C. 27536.

August 11
Sneads Ferry Shrimp Festival. Features shrimp boat parade, shrimp dinner, arts and crafts.

August 16
Strange Seafood Exhibition at the Hampton Mariners Museum in Beaufort. Learn to prepare and sample over 40 unusual seafoods. For more information contact the Hampton Mariners Museum, 120 Turner Street, Beaufort, N.C. 28516.

August 18
Sixth annual Outer Banks Folk Music Festival at the Marine Resources Center in Atlantic Beach. For more information contact Atlantic Beach Marine Resources Center, Atlantic Beach, N.C. 28512.



Outdoor Ethics Conference Set

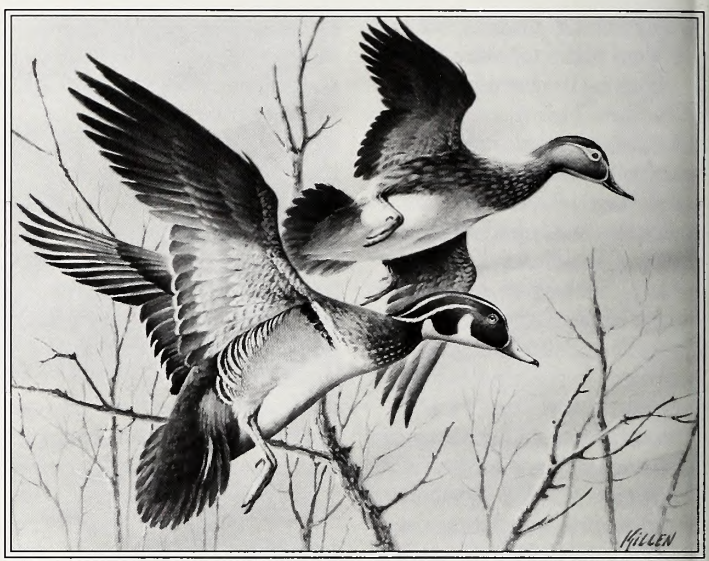
How can landowners, sportsmen and other outdoor recreationists work together to prevent landowner-user conflicts and outdoor abuse in the face of an expanding population? This is one of the questions that will be addressed at the first North Carolina Outdoor Ethics Conference. The event will be held on September 28-29 at the Penn 4-H Center near Reidsville.

The conference will focus on three goals — improving communications between landowners and outdoor users, promoting ethical standards among outdoor users, and developing techniques that everyone can use to improve outdoor ethics. Key representatives of outdoor-user groups and landowners will attend.

For more information contact Dick Brame, 1217 Duplin Road, Raleigh, N.C. 27607.

Deadline Is August 31

Buy A Waterfowl Stamp Print



Ken Taylor

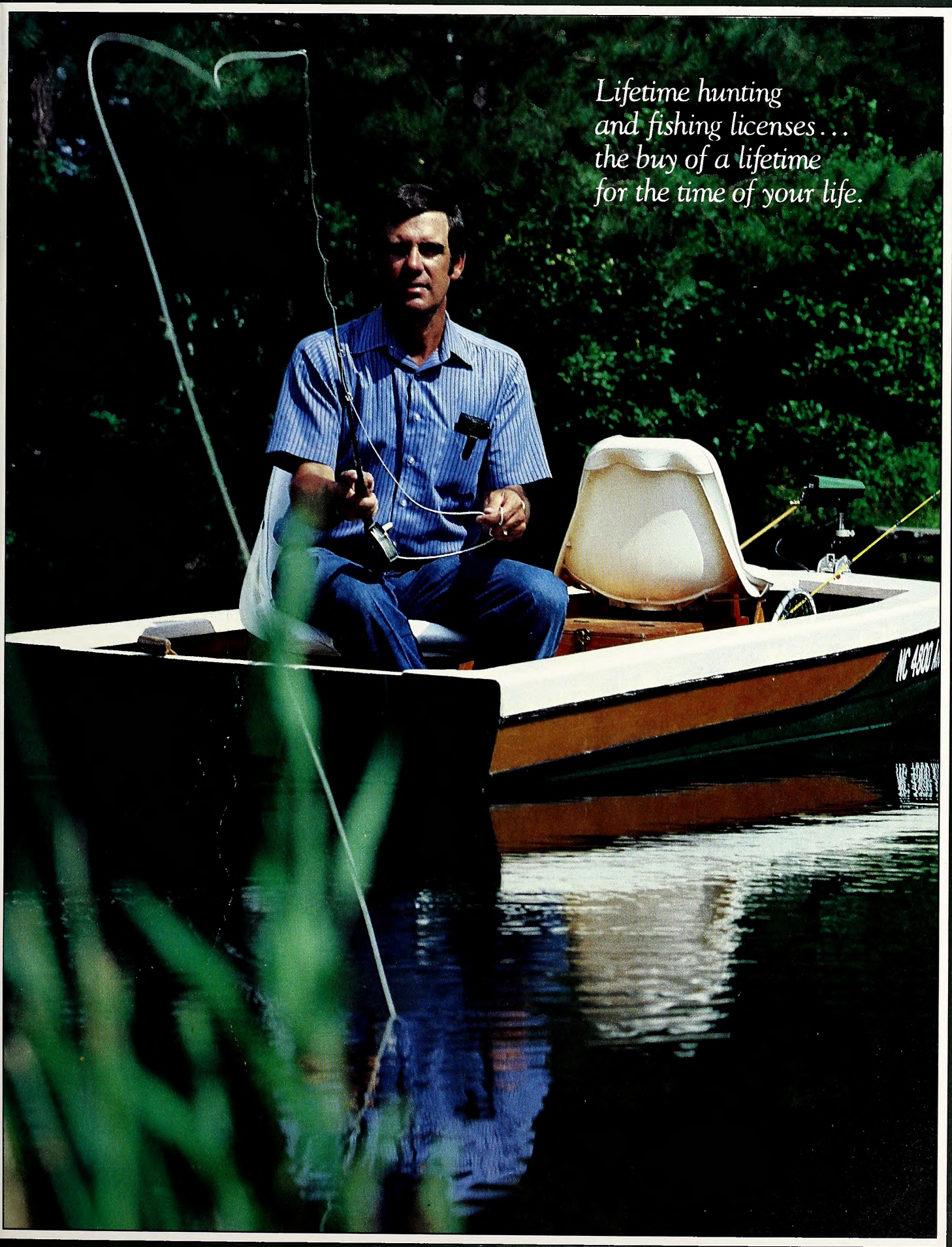
Move Fast: *The deadline for ordering limited-edition prints of the 1984 North Carolina Waterfowl Stamp is August 31. These prints are not being sold by the Wildlife Commission, but are available through art dealers statewide. The print features hen and drake wood ducks, and was created by well-known wildlife artist Jim Killen of Minnesota. Last year, over $600,000 was raised for waterfowl management in North Carolina through the state waterfowl-stamp print program.*

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on April 30, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	7,751	$2,282,584.30
Lifetime Hunting License	90	15,766.18
Lifetime Fishing License	366	61,092.66
Lifetime Subscriptions to Wildlife in N.C.	270	30,484.74
Contributions	—	37,358.35
	Fund Total:	$2,427,286.23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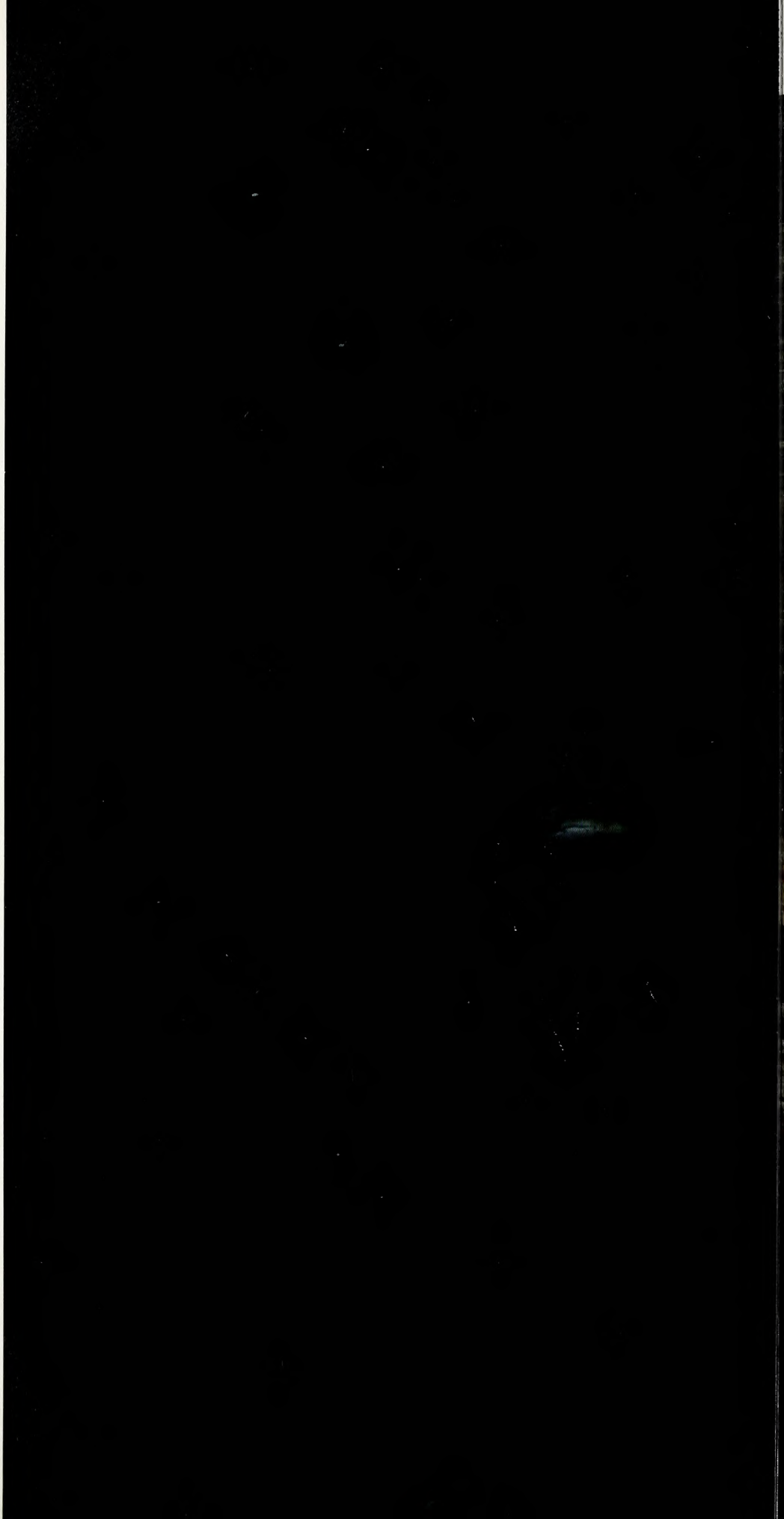
and fishing licenses...
the buy of a lifetime
for the time of your life.



Curious Smallmouths

Attracted by the light, smallmouth bass line up for a group photo, or is that a school photo?

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WILDLIFE IN NORTH CAROLINA

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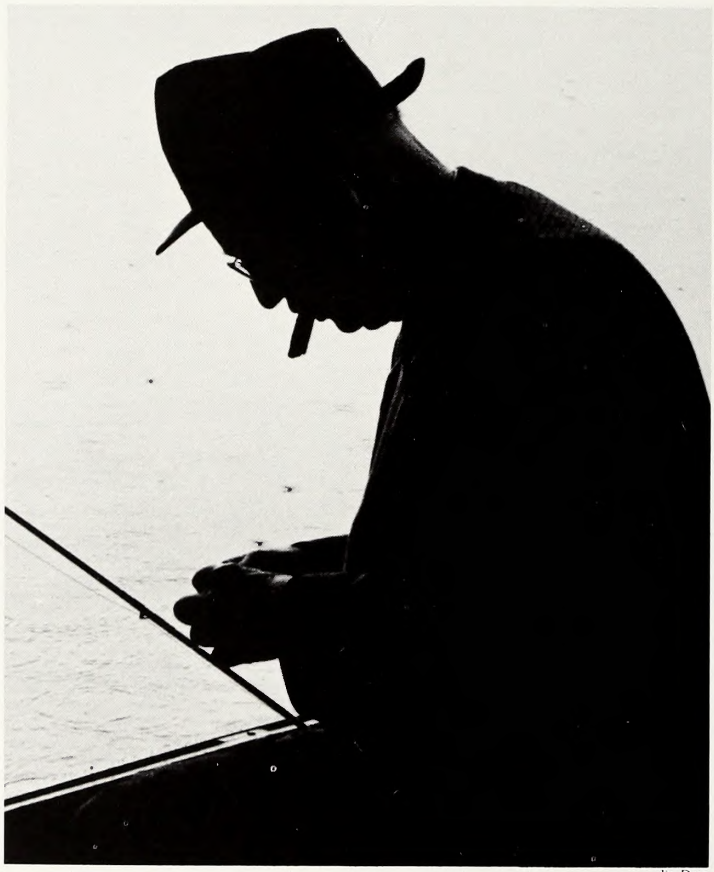
Kind Words About Bass Fishermen

by Jim Dean

A year or two before my grandfather died, he told me, "If anything happens to me, I want you to go into the garage and get my tacklebox, rods and any other fishing gear you want. It will be hectic around here for a few days when I pass on, and I don't want those things to get misplaced or be given away to someone else."

After he died, I kept his gear pretty much in the same condition as I'd found it in the garage. I used the paddles, but for years I kept the rest intact as a sort of memorial to the many good times we'd shared. I really didn't have much reason to want to use the split cane or old steel casting rods anyway. The steel rods were rusty and the cane rod had been broken and crudely spliced at some time in the distant past. But until recently, I didn't even use Grandfather's fine old aluminum tacklebox although it was better than mine.



Jim Dean

A few months ago, on a rainy afternoon I decided to look through the old box, and as I anticipated, it was a nostalgic trip. The box had always had a wonderful smell—a mixture of 6-12 insect repellent, reel oil, flyline dressing and five-cent cigars. Among the tins of hooks and familiar corks I found the crippled minnow that Grandfather had been using the day we stalked the big one.

We had located a sizeable bass next to a brushpile in the millpond we usually fished. Grandfather had missed the strike, but our return engagement a week later had been planned as carefully as the invasion of Normandy. That evening, we quietly loaded the boat and rowed across the pond. We even began whispering when we were within range. Grandfather cast the crippled minnow to an opening alongside the brush and a huge bass engulfed it.

I suppose we weighed the fish before we released it, but I don't recall what it weighed and that's just as well. On a soggy afternoon 30 years later, such details are unimportant. As I sat idly spinning the handle on my grandfather's old Pfleuger Supreme and recalling the many fishing trips we'd taken, I realized how much bass fishing has changed.

Back then, Grandfather had fished in a coat and tie instead of a jumpsuit, and the only patches he wore were the ones my grandmother sewed on the elbows. Those steel and bamboo rods have been replaced by graphite and boron, and the old knucklebusting reels have given way to free-spool, magnetic anti-backlash marvels. The crippled minnows and Oriental wigglers have been surplanted by a host of modern spinnerbaits, crankbaits and plastic worms.

Even the fishing vehicles have changed. There's a world of difference between a four-wheel drive truck and an ancient blue Buick with cane poles sticking out the rear window. The biggest changes have probably taken place in the boats used by bass fishermen. Today's bass boats are likely to cost $10,000 and are fully equipped with a powerful outboard, foot-controlled electric motor, live wells, depth finder, carpet, pedestal seats and a host of other features.

I'm sure there are fishermen who long for the good old days and wish they'd never seen a bass boat or a depth finder, but I don't entirely agree. It's true that I still like to fish ponds and small lakes in much the same fashion as I did years ago, but I also prefer most modern fishing tackle to the gear it replaced. The new reels are far superior, and the same goes for rods. Many of the new lures are also better than the old ones, although I'll admit some of those old-time baits were outstanding.

As for bass boats, they've caught the brunt of a lot of unfair criticism, mostly from those who don't realize that these boats are among the safest, most comfortable and most efficient fishing boats ever built. I suspect the real reason some fishermen long for the good old days and poke fun at modern angling technology is simply because there are so many more fishermen today, especially on large lakes.

Yet, there is nothing to keep us from seeking our solitude on countless smaller lakes and thousands of ponds. At such spots, we can choose to toss a traditional deer hair bass bug with a thoroughly modern graphite fly rod and get the best of both worlds. And when we fish the larger bodies of water in a modern bass boat, we can still maintain the age-old traditions of sportsmanship, and practice the angling ethics that perpetuate our sport. After all, someday these will be the good old days.

As for me, I've brought my grandfather's tacklebox out of retirement to help me bridge the gap. Among the modern plugs, plastic worms and hi-tech reels, you can still find a pack of grandfather's cigars and a few other mementos. I think he'd like that. And that old tacklebox smells just as good as it ever did.

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September, 1984
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WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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DEPARTMENTS

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Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *Steve Maslowski captured this gray squirrel on film just as it stretched to take a sip of water in this woodland pool.*

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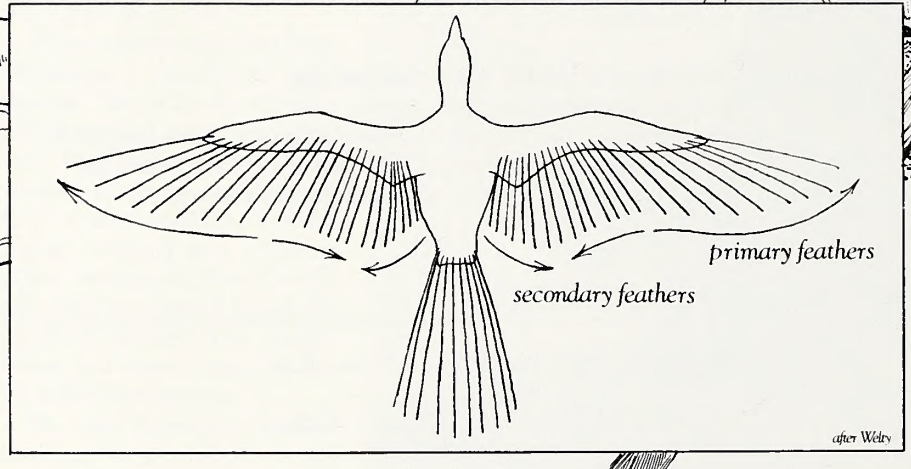
first spring *second winter* *second spring*

The rose-breasted grosbeak undergoes several plumage changes during its first two years. Many birds add feathers in autumn which help them weather the harsh cold of northern winters. In addition, their fall plumage is duller than their spring plumage. Drab plumages help birds camouflage themselves during the winter, but in spring males grow more colorful plumages to attract mates. Most songbirds follow an exact sequence (below) in molting their flight feathers. The primary feathers drop from the inside outward, while the secondaries drop from both ends of the forearm toward the center.



Preening anhinga illustrates the care that birds take to keep their feathers in good condition. At this time of year, however, nature takes over, causing many birds to molt their feathers. Birds generally molt several kinds of feathers (right).

The Molting Season

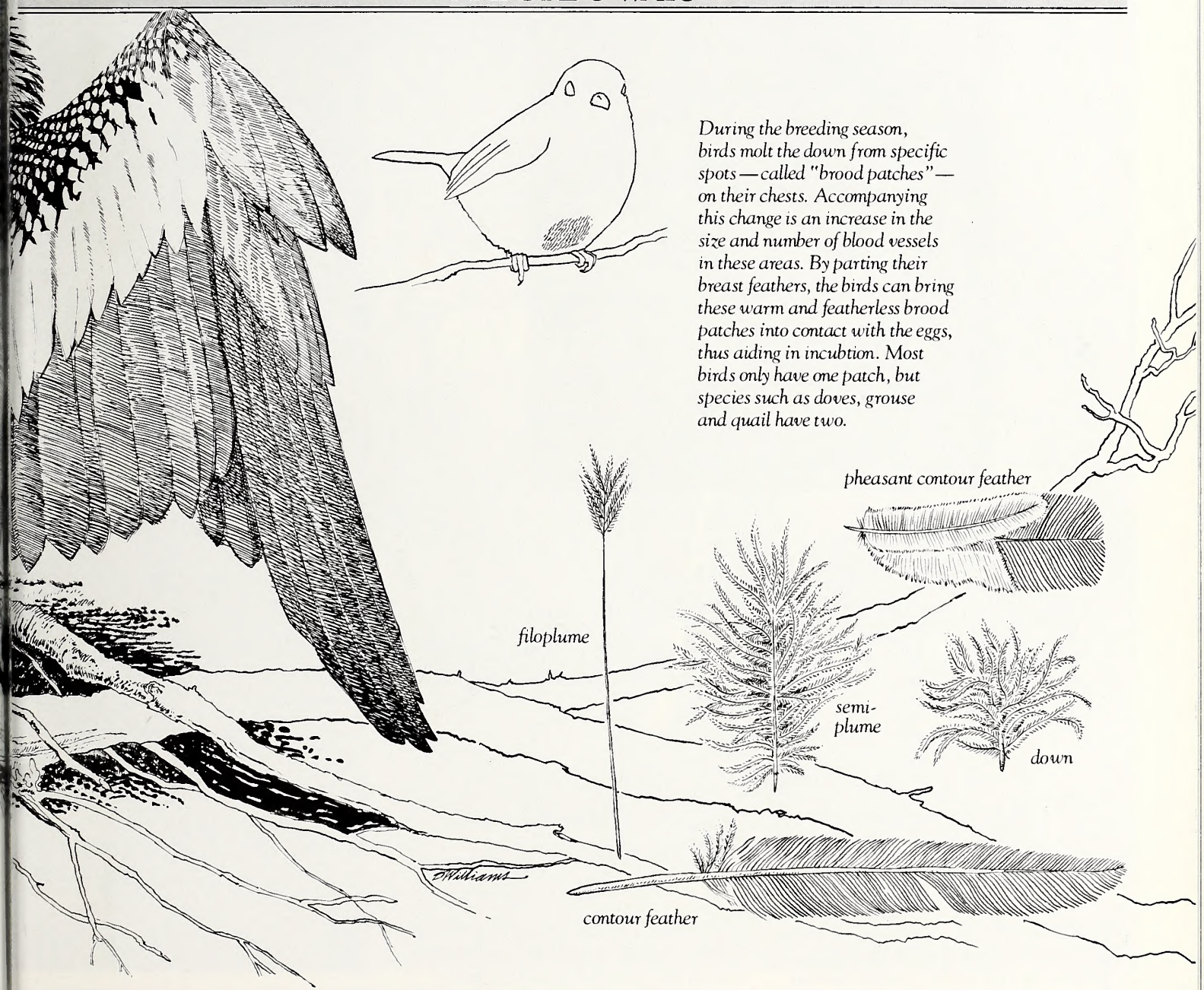
written by Lawrence S. Earley / illustrated by David Williams

As summer draws to a close, all nature is basking in ripeness, warmth and plenty, yet wildlife is already being prepared for the months of cold and scarcity to come. One sign of this preparation may be the feathers you are seeing beneath your trees and bushes. This is the molting season, the time of year when most of our native birds shed their feathers and grow new ones, which may be why some of our backyard birds are looking a little moth-eaten these days.

Molting is an essential activity for birds. It is vital that they be able to replace their worn and missing feathers periodically and late summer is one of the times birds can do so in relative safety. Most birds molt completely once a year, usually right after they breed. Over a period of time they will shed their wing, tail and body feathers, replacing them and adding more feathers for the winter months ahead. Then next spring they will undergo a partial molt, shedding only some of their feathers.

There are so many variations in molting habits that it is hard to say which one is typical. Some birds molt their body feathers first, others their wing and tail feathers. Some migrate first and then shed their flight feathers, while others seem to want to get it over with all at once and molt before they migrate. David Lee, curator of birds at the N.C. Museum of Natural History, observes that sea-birds and warblers molt in this way. "Seabirds lose one major flight feather a week over 10 to 11 weeks," he says. "Their body feathers are less important and can even be molted as they migrate."

Ducks, geese and swans also molt before they migrate south to their winter grounds, but unlike most birds, they shed their flight feathers all at once, becoming flightless for a time. The male duck



During the breeding season, birds molt the down from specific spots — called "brood patches" — on their chests. Accompanying this change is an increase in the size and number of blood vessels in these areas. By parting their breast feathers, the birds can bring these warm and featherless brood patches into contact with the eggs, thus aiding in incubtion. Most birds only have one patch, but species such as doves, grouse and quail have two.

molts before the female. Ordinarily the drake is the more brightly colored of the two, but well before its wing molt has begun it molts its body feathers and dons a drab plumage, called the "eclipse" plumage, that will help camouflage it while it is flightless. In about two months the drake molts this dull-colored plumage and once again grows showier feathers. Thus different kinds of feathers can grow out of the same papilla, or skin tissue that nourishes the feather, depending on the time of the year.

Songbirds would be in trouble if they molted their feathers all at once. Thus our backyard birds lose only a few of their flight feathers at a time, usually in an orderly sequence (see illustration). Woodpeckers molt their tailfeathers in a similar way. Without tailfeathers a woodpecker would not be able to prop itself up on a tree and feed, so it molts two at a time, from the middle toward the outside, while keeping its two middle feathers — the strongest —. for last.

Molting is as natural as replacing skin or nails, although it occurs more seasonally than either. And unlike these human bodily processes, molting takes energy which is why birds are a little subdued at this time. There is some evidence as well that molting is accompanied by other physical discomfort. David Lee notes that birds sometimes rub ants against their bodies during the molting season, possibly because the acid from the crushed bodies of the ants eases the itching caused by the growth of new feathers. This may also be why birds engage in "dirt baths" about this time.

Scientists are also curious about why birds molt when they do. Some believe it's genetically determined — a bird molts in late August because it's been programmed to do so — but it may be that the environment plays a part as well. By changing some birds' diets in mid-winter to a food eaten only in summer, researchers were able to cause the birds to start to molt their wing feathers.

Many of the birds that are molting now will perish this winter — by predation, by starvation, by cold. But for the majority that survive, their new feathered coats may have provided the extra edge.

Mike Gaddis

Hi-Tech For Dog Handlers

by Mike Gaddis

Radio telemetry gives dog trainers a "sixth sense" which can be a tremendous benefit in keeping up with wide-ranging dogs.

If the last time you looked, an orange collar and a bell were the latest in keeping up with your canine hunting companion, better take another turn around the block. It's 1984 and George Orwell's prophetic novel is coming true, at least for the dogs.

The explosion in high-tech electronics first reached the dog-conscious public through shock collars. Those first primitive shock collars have evolved to include such Pavlovian refinements as variable intensity stimulation and a conditioning, avoidance, and relaxation sequence. Today high-tech training tools also include remote bird releasers, audible beepers with alternating tones at movement and rest, and the bionic ear, a sound amplification system.

Electric collars commonly extend the control range of today's hunters and dog trainers beyond the traditional check cord. Push-button training methods have become both a blessing and a bane because, up to now, all the electronic aids presented a common dilemma. Applied in the proper fashion, they can solve problems with individual dogs that would have persisted under conventional means. Applied improperly, they can create faults in record time. A divided camp emerges where many swear by them and others swear at them. Most are somewhere in the middle, timidly uncertain.

There's a new item on the scene free of this double-edged intimidation. I'm not prone to commercials and I'm not that easily impressed, but I will honestly say this one has me excited. It's radio telemetry, a surveillance and tracking device. Telemetry fills a unique training niche and promises a lot less anxiety. Dog people who care need to know about it.

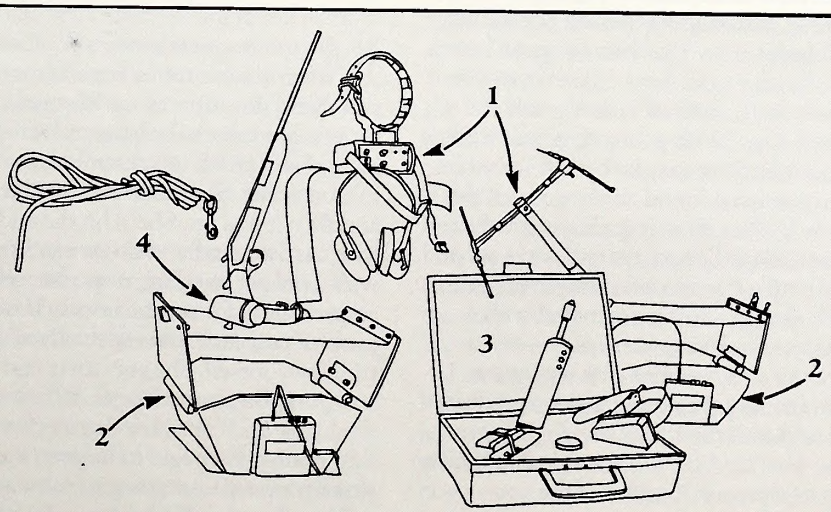
Radio telemetry is not new in the technical sense. It's been used for years in wildlife research to track everything from hummingbirds to whales. But its application in locating and training field dogs is new, and it's going to turn a lot of heads. It became generally available to the public in 1981, and has been slowly gaining favor as it becomes more widely known. There are now a few units in the hands of bear, cat, deer, fox, and coon hunters, who are using them to monitor

This setter's high, proud point (left) is the result of good breeding and lots of hard work. With radio telemetry, you can share this experience with your dogs regardless of how wide they range. Indeed, dog trainers are calling telemetry the greatest tool ever.

© copyright, Mike Gaddis, September, 1984

Mike Gaddis

One key to dog training is knowing your dog's location at all times. Radio telemetry keeps you in touch with your dog, and no time is wasted getting to a dog on point or one that is self-hunting. Telemetry is not the only piece of contemporary electronic equipment available for dog trainers. In addition to the radio telemetry tracking system (1), there are also remote bird releasers (2), remote electric trainers, also known as shock collars (3) and variable motion beepers (4). Of this equipment, however, the radio telemetry system is by far the most useful. Its basic components include a transmitter, collar, receiver, directional antenna and headset.



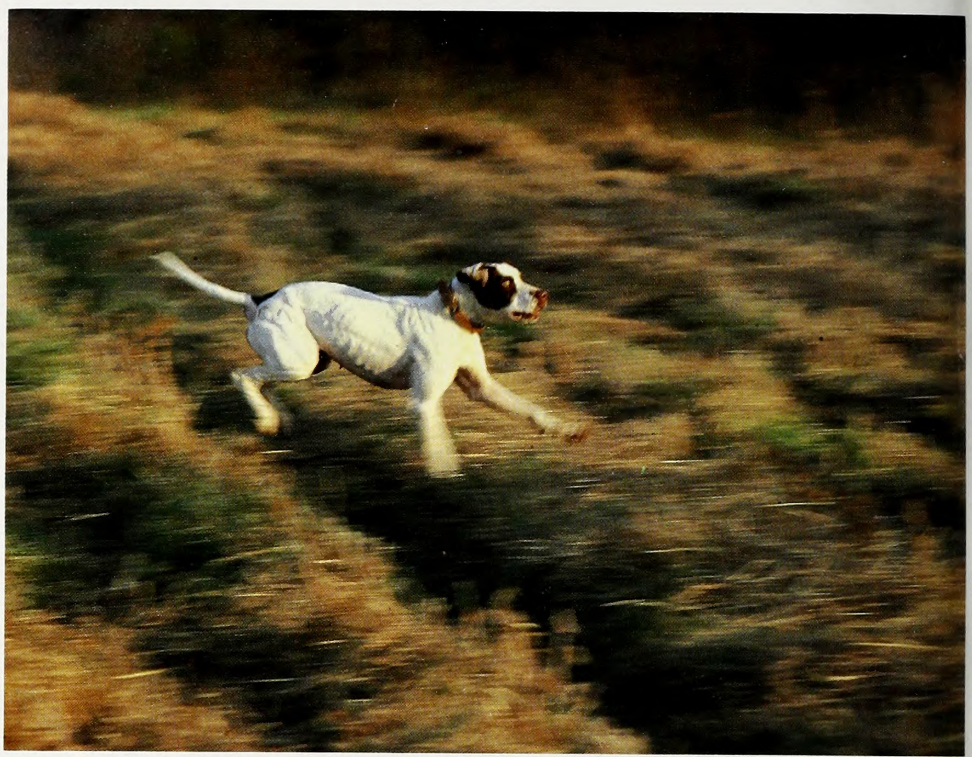
dogs and their performance during hunts and field trials. In addition to myself, one other amateur and one professional are to the best of my knowledge the only ones in the country as of this writing using it with bird dogs.

The basic equipment in radio telemetry consists of a small, collar-attached transmitter, a receiver, a directional antenna, and a set of earphones. Hermetically sealed and waterproof, the standard transmitters for dogs are available in three, six, and nine ounce weights. Powered by a sealed-in high capacity battery, the transmitter emits an inaudible, pulsing signal which is picked up by the receiver, located by the directional antenna, and amplified by the earphones. The fixed life of the transmitter battery is about six months non-stop, much longer when used intermittently as with hunting dogs.

The receiver weighs two pounds and its batteries are rechargeable. It has a 20 channel capacity, which means you can track up to 20 different dogs if you have enough collars. The receiver, antenna, and earphones can be carried on the person, easily attached to the saddle of a horse, or hung on the gun rack of a pick-up. The dog, of course, carries the transmitter.

Radio telemetry is primarily thought of as a tool for tracking and locating wildlife species, features which are immediate advantages with dogs also. But specialized applications in wildlife research have led to other capabilities which extend its possibilities with field dogs into dimensions nothing else can touch. For instance, there's a motion sensor option which could have easily been designed with bird dogs in mind. The pulse rate from the transmitter hits a fast clip while the animal is in motion then switches to a slower rate when the animal is at rest. The bird dog application, of course, is that when the dog points, the rate changes over. The delay time can be set by the factory as desired. Mine trips over at 15 seconds. Generally, that's okay for finished dogs. With young dogs just settling in, a shorter delay may be better. I ran into my professional friend not long ago at the Region 16 Shooting Dog Championship and he told me he had just ordered a second collar with a five second changeover. I can readily see the advantages in that with youngsters and jumpy birds.

There's also a relative activity sensor which changes the pulse rate on a graduated scale to match the rate of the dog's movement. This has been used in fox dog trials to evaluate the coursing pace of the contenders. If you really want to get refined about things, there's a "tip-switch" which varies the pulse rate yet again to tell you whether your dog's head is up or down. It can be combined with the motion sensor in the same collar. That way you can know not only when your dog points but what kind of style he's doing it with, and if you know bird dogs, how close he is to the birds. I told you it was 1984! It might be noted more seriously though that the main use of the tip switch has been with coon dogs to tell when they tree out of hearing.



Ken Taylor

Keeping up with a hard-running dog is simple with radio telemetry. The dog is fitted with a small transmitter that gives off a beeping signal which is picked up by the receiver. At a distance of one to two miles, you don't need the headset, but under optimum conditions the maximum tracking range may be nine miles with the headset and reasonable antenna height. Wildlife biologists use this equipment to track wildlife, but its adaptation to dog training is new.

My interest in telemetry equipment started in a rather natural way, with a problem dog. One of my best field trial setters developed a bolting and self-hunting habit that started, incidentally, from being lost on point. She found out she liked that and then it was on. She'd hit the end of a long cast, and rather than swinging around with a proper handling response, sell out and self-hunt for several hours. That's a big problem anytime, but especially when you train by yourself. She got worse and would stay gone longer and longer. When you have a valuable and cared-for dog lost for three or four hours, you begin to be pretty anxious, wondering if you're going to see it again.

The straw that broke the camel's back came on a brittle January night. I loosed her that afternoon for an hour workout, and she pulled the disappearing act. Eight bone-chilling and no-supper hours later, it was midnight and I was on a horse in the middle of nowhere still frantically searching every nook and cranny of 3,000 acres. There was no moon and it was pitch black. Every once in a while the walkie-talkie would crackle and my wife's voice would come on from the truck somewhere on the 15 mile perimeter, and we would have to acknowledge that neither had seen her. I truly thought she was gone for good. When we finally were fortunate enough to find her, I promised myself I would not run her again until I had an answer.

I was somewhat familiar with telemetry and its use in wildlife management, but I wasn't sure it was accurate enough to pinpoint the exact location of a dog and lead me directly to it. To satisfy myself, I talked to Dr. Phil Doerr, a zoology professor at N.C. State University, who has used the equipment frequently in applied research studies. His practical explanation of telemetry and its adaptability to a woodcock project convinced me I was on the right track. One further discussion with Scott Osborne, a biologist and project

Hi-Tech For Dog Handlers

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Mike Gaddis

leader for big game studies with the N.C. Wildlife Resources Commission, had my pulse racing.

A month, some letters, and several phone calls later, I had located three companies which offer radio telemetry equipment. Following references from a number of professional users, I decided to take a chance on Telonics, a specialty firm in Mesa, Arizona which has supplied telemetry units to professional wildlife agencies for years. I wasted no time in sending a serious inquiry. The reply, surprisingly, came from Jonesboro, Louisiana. Jerry Ginn, I was pleased to learn, is a deer hunter and electronics technician from that area who had only recently received the first public franchise for Telonics' equipment. Jerry's interest in telemetry started with deer dogs and has grown from there. He was able to obtain a personal unit, and when friends learned of it they began knocking on his door. Jerry is an easy-going country boy, and a pleasure to work with. If you ask a practical question, you get a down-to-earth answer.

I had plenty of questions for him the first time we talked.

"How close can I expect to locate my dog?"

"You can walk right to him if you want to," he said. "The directional antenna is very accurate and the signal gets stronger the closer you get. When you get real close it'll change to what sounds like a deep heart-thud. You just home in on the signal."

"What kind of range are we talking about?"

"Oh, it'll get anywhere from three to nine miles, depending on the lay of the land. A little less in hilly country; on out there in flat land, particularly with the high power option."

"Is the transmitter frequency high enough to keep out the junk?"

"Yeah, it's way above all the CB and common radio frequencies. I've never had any trouble. You do get a little interference from high-tension wires now and then, but you can move a short distance and get away from it."

"What's the warranty period?"

"Three years."

All the answers were coming back right. Two days later, I dropped a check for $1400 in the mail. Understandably, that's the one thing that might stop a lot of potential buyers cold. At this point, the equipment is still relatively expensive in comparison, for instance, to an electric collar at $595 or a couple of remote bird releasers at $590. As the market grows the price will likely fall as has been the trend with modern electronics. However, so may the warranty period. Dog training electronics will continue to remain a specialty market so don't expect the dramatic price drop that occurred with pocket calculators. I decided if telemetry would do what I wanted, it wasn't expensive compared to the emotional and financial value of a prized dog.

Since January of 1982, I have used radio telemetry two to three times a week in my personal training program. I found from the beginning that it would locate dogs with unerring accuracy. That in itself is invaluable. How much is it worth to *never* lose a dog on point, to never have the training undone that occurs when you do? How much is it worth to get to a young dog in the shortest time possible? And to know that you never again have to worry about losing a dog? Quite a bit, I venture.

By the way, the problem I started with was solved in two workouts. It was downright humorous. My problem dog hit the end of a big cast and sold out as usual. This time I didn't holler until I was hoarse or get the least bit nervous, because I was tracking her the whole while. I just rode quietly to her and let her know I was there. She looked as if she'd seen a ghost. One repeat occurrence of that and she's been a different dog.

It's put a world of enjoyment back in my training sessions. I simply lay back and let the dogs roll. No matter how big they run, I know where they are and when they point.

Having gained experience with telemetry, I'm discovering other training and hunting advantages too. Windy days and high cover are no longer problems. Since I can track a dog's progress continually, I can pick up faulty hunting patterns in young dogs as

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they emerge and correct them before they become habits. I can tell what kind of pace and range I'm getting by the movement and intensity of the signal. And I can tell if the dogs are remaining staunch on their game.

As one trainer put it, "It's making me better and it's making my dogs better. Why wouldn't I like it?"

Other folks who have telemetry systems feel the same. A. J. "Lucky" Cornish is a professional guide from La Pine, Oregon. He books a few parties each year for cat, bear, deer, and elk. He uses a pack of five to seven dogs, mostly Walkers, Plotts, and Redbones. "Lucky" was the first dog handler in the country to have telemetry equipment, obtaining it from the factory before the public franchise. That was about six years ago.

His opening remark when I asked for his opinion was simple and straight-forward: "I won't walk out the door without it."

"I've hunted for 50 years," he continued, "and looked for dogs 34 of 'em. All night long, time and again. I've spent as much as 30 or 40 dollars a day trying to find dogs. I haven't done that in a long time now, and that's been nice. When the dogs are running I track 'em all along. We've got canyons out here with one draw after another, and the signal won't go through the hills. But I can jump from one hill-top to the next and follow them with no problem. You can tell when they cross from draw to draw, and I know the country. I can tell when they come to bay and just about tell you the exact tree they're under. I've got six transmitter collars now and a 10-channel receiver. I haven't had to replace the batteries in the original collar yet!"

In Xenia, Illinois, Noel Henson uses telemetry to keep up with his fox and coyote hounds. He runs nine dogs at present, four Walkers, two Goodmans, one July and two July/Plott crosses. He uses five transmitter collars and has a roof-mounted antenna on his truck. The truck-top antenna is non-directional, but does allow him to stay within range of his dogs more easily. When he needs to know their exact location, he uses the directional hand-held version.

"The longer you have tracking equipment," he says, "the more you can tell. I just don't turn a dog loose without it anymore. And I no longer worry. I know I can find my dogs. Once in a while I'll lose the signal for a

Mike Gaddis

Bells, beepers and check cords are all familiar ways of keeping track of a dog, but they don't hold a candle to a radio telemetry tracking system. Nor are bird dog trainers the only dog handlers to find telemetry useful. Those who train hounds and beagles for coons, foxes, bears, cats, rabbits and other game can also profit from telemetry, and a few trainers are already using it. The initial expense of the equipment is its only drawback, but it can pay for itself.

Mike Gaddis

Ken Taylor

What would a hunter give to be able to know precisely where his dogs are at all times. Telemetry can keep track of hounds and beagles, and even tell you when dogs tree their quarry, or when they're on point.

few minutes. Dogs on a coyote may go five miles or more; we had one go 10 miles straightaway one time. When the signal fades, I've learned to look for a high place. Then I can pick it back up. I've thought about keeping a long pole in the back of the truck and putting the antenna on top of that when I need extra height. I believe that would work well."

I've had some interesting things happen. A collar fell off a dog one day. I didn't have it fastened well enough. But I was able to walk right to it after I figured out what had happened. Another time a neighborhood boy took the collar off and hid it under a barrel in an old shed. Wouldn't tell me where it was. But I turned the receiver on and the signal was loud and clear. The rest was just like hide-and-seek."

Beyond its use in hunting and training, it is also easy to visualize the usefulness of radio telemetry in field trials. Many fine and valuable dogs are lost or stolen during competition each year, resulting in grief for owners, undoing the hundreds of training hours invested, costing thousands in rewards, and often ending in the death or disappearance of the animal.

Telemetry could prevent such losses. Transmitters can be surgically implanted under the skin, removing the obvious presence of the collar unit. A handler could turn the receiver over to the judges for the duration of the heat or until the dog was officially lost from judgment. Or a state field trial association could buy a unit for use by its member clubs and have collar frequencies known only to club officials. At present, rules for pointing dog trials do not allow auxiliary electronic devices as an aid in handling, but telemetry has not been taken into account in their adoption. There would be some potential problems, such as dogs used to running with an electric collar, which weighs about the same as the transmitter collar, but the advantages may well be offsetting. It seems a surety that the directors of the Amateur Field Trial Clubs of America and the American Field will have to consider the question seriously within the next few years.

Telemetry is already being used in competition hunts for coon and fox dogs, both for location and evaluation of the dogs. Noel Henson figures it to be a real advantage in fox trials.

"In a three or four day trial," he says, "stamina is everything. Over several hunts, up to 50 percent of the dogs may fall out. If your dog quits, he's scratched and it's a long drive home. If you can get to him fast when the hunt's called, and rest him up good before he's down again the next morning, it makes a difference."

The equipment being offered to the public at present is identical to that which has been used for wildlife research with small mammals. It transfers quite well into field dog work as is, but market growth will likely compel convenience refinements such as smaller receivers, flexible antennas, and specialized training features not currently available. The H-type antenna supplied at present is somewhat inconvenient, particularly in the woods. It has an element width of 36 inches and is of rigid metal construction, which makes maneuvering difficult in tight cover. It can be carried disassembled until needed and takes only a minute or so to put together, but this is a bit troublesome. On the plus side, it is durable. Mine has been bent and successfully straightened several times, though one of the terminal ends sheared on one occasion and had to be replaced. For all the advantages, I can put up with a little inconvenience, but this would be a good place for a little improvement.

If you walk field edges or use it from a road, all this is of little concern.

Considering the total case, telemetry's special appeal becomes apparent. It offers extra-sensory perception in a maximum utility package. Suddenly, there's a "sixth sense," without discomfort or even awareness for the dog, and you know things you couldn't before, things that make a difference. And you can reestablish contact when you need to, in minimum time. Beyond the obvious peace of mind this provides, it will move the percentage opportunity for behavior modification closer to one hundred. This will be the greatest benefit, allowing a gentle training regimen rather than the harsh methods which become ultimately necessary when negative reinforcement has been lacking, applied with improper timing, or applied sporadically. Dog training is a proportional ratio. Reduce the amount and severity of the discipline necessary to bring a youngster along, increase the number of times you're there when you need to be to correct undesired behavior as it occurs, and you'll have a better dog sooner.

One last thought. I get myself lost too, now and then. You ever do that? With telemetry, there's no excuse anymore. Just leave a transmitter at the truck and carry the receiver and antenna along. When you're ready to go in, make a beeline where it tells you to. You can leave the compass at home. I'll guarantee it! ⊠

Curtis Wooten

Dogs That Hunt Squirrels

by Curtis Wooten

The use of small dogs to help hunt squirrels is an old southern tradition that's worth reviving.

The small dog danced about the feet of its master and then took off down the woods trail, poking its nose into stump holes and sniffing around the base of every oak and hickory tree. It had beagle traits but was obviously of mixed lineage, and was owned by the cousin of a neighbor visiting for the Thanksgiving holidays. I knew it wasn't right to covet something like that, but I couldn't help myself. It was the first "squirrel dog" I had encountered in my young hunting career, and the half-dozen gray forms that hung heavily in its master's left hand were an impressive testament to its value.

That first encounter with a squirrel dog occurred better than 20 years ago, on a crisp late-November afternoon. My hunting career was in its infancy then. I was 13, and squirrels were the focus of my outdoor adventures. Hours stolen from chores after school and on Saturdays were spent in the bottomland hardwoods near my home in pursuit of the furry gray ghosts.

At that early age I felt I had mastered the finer points of stalking and still hunting squirrels. I could identify the oaks, hickories and beech trees that they favored for nuts and dens. I knew that the number of leaf nests located in high branches was an indicator of the relative abundance of squirrels in the area, and that the amount of cuttings (bits of hickory nut, acorn hulls and pine cone shavings) scattered on and about the base of stumps and trees indicated a good place to hunt. I also knew that a good deal of patience was required to be a successful squirrel hunter and I had worked at developing mine. Once settled snugly against the base of a sturdy oak, I could sit there for two, sometimes three, minutes before spotting another tree with a more comfortable seat, better vantage point or some other advantage that demanded relocation. In the early season when

Ken Taylor

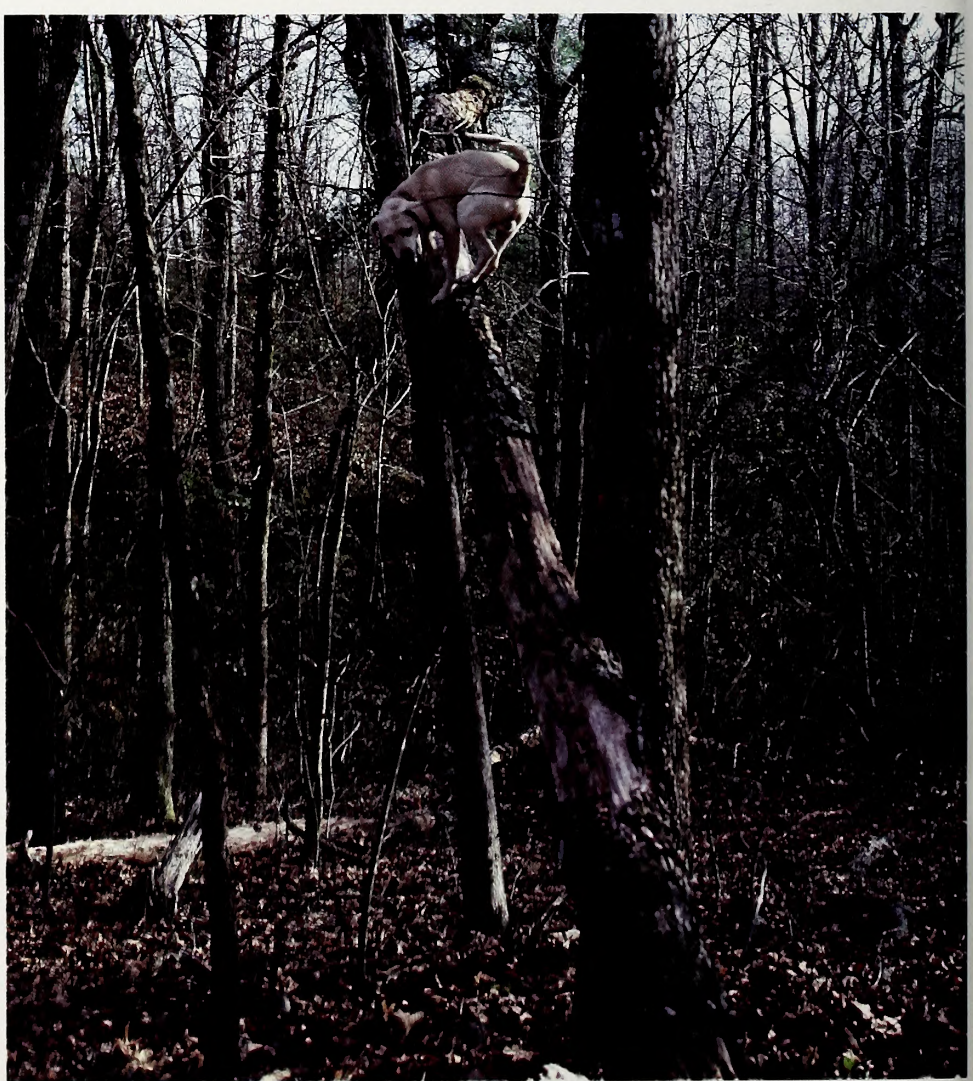
Though the best squirrel dogs are often feists—originally mixtures of several breeds—some owners are very careful to preserve the bloodlines of feists once a good mixture is established. Randy Ross (left) is only 19, but he's a firm believer that feists make the best squirrel dogs.

"There are several advantages to hunting squirrels with a dog, not the least of which is an increase in the number of squirrels in the bag."

Curtis Wooten

Curtis Wooten

Dogs that hunt by sight are generally preferred to dogs that hunt squirrels solely by smell since they are less frequently fooled, although some excellent dogs use both senses. Some dogs will also try to climb trees to reach their quarry.



squirrels were plentiful and unwise to the ways of young hunters. I dented the surplus of squirrels that inhabited my favored bottomland haunt, cropping those that were equally short on patience.

The late season was another matter. In November and December when a cold north wind whistled through naked tree branches and leaves popped underfoot as if loaded with tiny firecrackers, squirrels were scattered and hard to find. It was on such a day that I first met a squirrel dog and realized the advantage it gave the hunter.

Even back then, a good squirrel dog was a rarity among hunters, although the squirrel was at that time the number one game animal in North Carolina. Today, the squirrel has fallen behind the deer as the most sought quarry here, but if anything, a trained squirrel dog is even more rare.

A novice hunter can usually recognize the dog breeds commonly used for hunting rabbits, raccoon, quail and many other game species. Not so with squirrel dogs; they come in all sizes, shapes and colors. There is, however, one that stands out—the "feist."

"All kinds of dogs—hounds, shepherds, collies, terriers—are used to hunt squirrel,

Curtis Wooten

As has always been the case, the best hunts are those that team man and dog in the quest for a quarry. Using a dog to hunt squirrels is no less satisfying than following an English setter in prime bobwhite country.

but the feist is the best," says Randy Ross. Randy, 19, is the son of Ronnie Ross, a career wildlife enforcement officer with the Wildlife Resources Commission. He lives near Hudson, in Caldwell County, at the base of the Blue Ridge Mountains.

Like many North Carolina hunters, Randy was introduced to squirrel hunting and squirrel dogs at an early age by his dad, uncles and cousins. The family has maintained a line of "tree mountain feist" squirrel dogs for years and takes considerable pride in the bloodlines and training of their dogs.

Interestingly, the feist is not really a "breed" of dog. Webster defines "feist" as a term used locally in parts of the United States to describe a small dog. As a breed, the bloodlines of most feists found in North Carolina are from the Northamptonshire Terrier. Though there are no papers or pedigrees available for feists, many of the little hunting dogs have been kept by the same families for years and many owners take as much care with their breeding and training as the most devoted bird dog fancier or coon houndsman.

There are several advantages to hunting squirrels with a dog, not the least of which is an increase in the number of squirrels in the bag at the end of most hunting days. But Randy says that's not the primary reason that he trains and hunts his feists. He comes from a family of hunting-dog fanciers. His dad keeps a half-dozen English setters on hand most of the time for quail and grouse hunting. Randy and a friend have a small pack of coon hounds, and, of course, there are the feists.

"I like to hunt with a dog," Randy says. "For me, it's just more sport. I enjoy training them and being with them in the woods. They add a lot to the hunt. Of course, late in the season when squirrels are difficult to locate, a dog can help find more—just because they cover more territory. They'll also find squirrels you would often walk by when hunting without a dog, and they help decrease the loss of wounded squirrels. If you wound one and it gets on the ground and runs under a rock or stump, the dog is there to find and retrieve it for you. With a dog you get a high percentage of squirrels you might otherwise lose."

Randy says that, breeds notwithstanding, there are two kinds of squirrel dogs: those that tree by sight and those that tree by smell. He prefers those that tree by sight. "A dog that trees by sight will have a squirrel in the tree most of the time because he keeps it in sight and moves with it from tree to tree as the squirrel moves in the branches above. A dog that trees by scent will often stay at one tree after the squirrel has long since left." He says that most good dogs use scent to locate a squirrel, particularly in the late season when squirrels are scattered and not moving about much, then use sight to follow or search for animals in the trees.

Training a squirrel dog is much like training any other treeing hound, according to Randy. "There are a couple of ways to go about it," he says. "If you have an older, trained dog, you just carry the young dog you're training along on hunting trips and let the young dog pick up hunting skills from the older dog, adding encouragement when the dogs tree a squirrel. Otherwise, the best way to train one is to put it on a lead and take it with you still hunting. Find a comfortable seat in an area being used by squirrels and when one comes along, make sure that the dog sees it, then turn it loose.

Squirrels Are Good Eating

One of the reasons for the popularity of squirrel hunting is the prospect of a Brunswick stew or squirrel casserole on the dinner table. Squirrel is one of the most tender of wild meats with a mild, rarely gamey flavor. Many compare its flavor and texture to that of the dark meat of chicken and interchange squirrel in chicken recipes. Squirrel with dumplings is a favorite in many Tar Heel households, and squirrel was the primary meat in colonial recipes for Brunswick stew.

Brunswick stew is a traditional dish of the Old South, its invention credited to the Moravians who settled near Winston-Salem. It calls for squirrel with perhaps a rabbit or gamebird thrown in, and in some quarters venison may be included. The stew always includes beans, corn and tomatoes, although proportions and seasonings may vary according to local taste. Brunswick stew freezes well and is often made in large quantities; simply increase the ingredient amounts that follow.

Brunswick Stew

4 small dressed squirrels or 2 or 3 large ones
¼ cup salt pork, diced
1 large onion, diced
½ teaspoon salt
¼ teaspoon black pepper
1 teaspoon sugar
28-ounce can tomatoes
2 cups diced potatoes
1 cup small lima beans, or 2 cups cut butter beans
1½ cups fresh or frozen corn niblets
Dash Worcestershire sauce
2 tablespoons butter

Cut the dressed squirrels in half. Lightly sear the salt pork in a Dutch oven or heavy kettle. Add the squirrels, cover completely with water, and bring to a boil. Skim. Add the onion, salt, pepper and sugar, and simmer uncovered until the meat falls from the bones. Lift the squirrels from the broth and remove the bones. Dice the meat and return it to the pot.

Mix the tomatoes, potatoes, beans, and corn, adding water if necessary to barely cover. Continue simmering, stirring up from the bottom of the pot as the stew thickens. Add salt and pepper to taste and a good dash of Worcestershire sauce. Simmer until the stew is reduced to the consistency of thick soup, stirring frequently to prevent scorching. Before serving, blend in the butter. Serves 4 to 6.

Squirrel Casserole

3 small squirrels, (cooked and boned as for Brunswick stew, should make about 4 cups of diced meat)
1 package Pepperidge Farm dressing mix
1 can cream of mushroom soup plus one cup of water
1 can cream of chicken soup
½ stick butter, cut up on top

Layer ingredients in a casserole dish with butter on top and bake for 30 minutes at 350 degrees.

Squirrel Stroganoff with Mushrooms, Onions, and Sour Cream

¼ lb. diced salt pork or 6-7 slices bacon, diced
2 squirrels, cut into serving pieces
¾ cup flour
2½ tsp. dry mustard
1½ tsp. thyme
½ tsp. pepper
1½ tsp. salt
¾ cup chicken broth
1 large onion, diced
¼ lb. mushrooms, sliced
3 tsp. butter
2 cups sour cream
¼ cup sherry
minced parsley

Fry out the salt pork or bacon until brown and crisp, remove from pan. Roll the squirrel pieces in the flour mixed with mustard, thyme, pepper and salt, using all of the flour mixture if possible, and brown the pieces over medium heat—takes about 15 minutes.

Add the chicken broth, cover, and simmer until tender—about 15 minutes.

While the squirrel is simmering, saute first the onion, then the mushrooms, in butter and set aside.

When done, remove the squirrel pieces temporarily and stir in the sour cream, onion, and mushrooms. Make sure the sour cream melds with the other ingredients, and if necessary add a bit of hot water. Simmer for 5 minutes, but don't let it boil.

Stir in the sherry, add the bacon or salt pork bits and the squirrel pieces, and simmer just until the squirrel is heated again. Garnish with minced parsley.

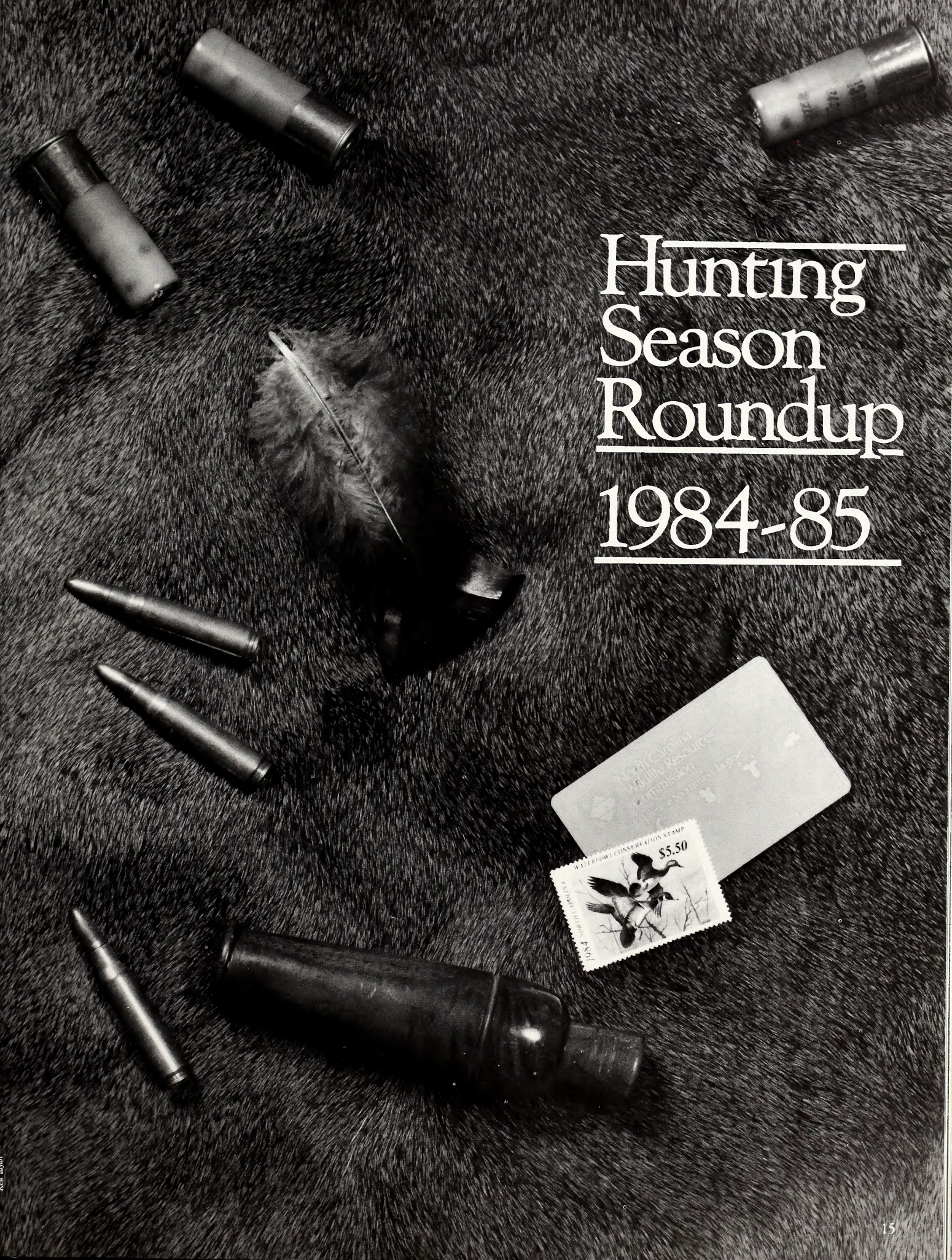
The dog almost invariably runs over and begins barking at it. Then shoot the squirrel, and after doing that a few times, they learn quickly. They may not bark at a treed squirrel at first, but you can almost always tell when they're smelling a squirrel around the base of a tree and after you shoot a few, a good dog just begins treeing. It's instinctive."

It is not always advantageous to hunt squirrels with a dog, according to Randy. "In the early fall, when the season first opens and leaves are still on the trees, hunting with a dog will sometimes hinder you," he says. "Leaves provide some excellent cover and when the dog trees you'll not be able to find the squirrel because they hide so well." He says that a squirrel dog is most useful on a hunt in the late fall after the leaves are down and squirrels are scattered.

"In the middle part of the day, particularly in clear, cold weather, squirrels often lie on limbs in the tops of trees, sunning. In many cases a hunter hunting without a dog would walk right past many of them, but the dog would smell it," he says. "The best type of day to hunt, though, is a drizzly, rainy day—the squirrels are out feeding more, their scent lingers longer and the dogs can smell better, and both hunter and dog can move through the woods more quietly. The only disadvantage to hunting on heavily overcast, drizzly days is that the squirrels are harder to see because they blend amazingly well with the bark of trees in low light."

There is really no ideal firearm for squirrel hunting. There are those who add a bit of zest to the hunt by restricting themselves to flintlock and percussion black-powder rifles, but they are still in the minority. Most youngsters start out with some sort of single barrel shotgun. The 20 gauge loaded with number fours or sixes is good, but so are the 16- and 12-gauge shotguns. The .22 rifle is also popular with many squirrel hunters, especially with a 4x scope. Randy prefers to hunt with a .22 rifle with hollow points in the early season when the squirrels are more prone to hold tight when treed, but switches to a 20 gauge single barrel shotgun in the late season when squirrels taken are almost always on the run.

Squirrel hunting in North Carolina peaked in the late 1960s when some 200,000 hunters bagged an average of 2½ to 3 million squirrels a year. In 1980 some 175,000 North Carolina squirrel hunters still bagged more than 1½ million squirrels. Despite the decline, the squirrel has retained much of its appeal in the Tar Heel state. I suspect that as long as there are aspiring young hunters, squirrel dogs and adults, with fond memories of youthful hunts, that appeal will last. ⊠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North Carolina Hunting Seasons 1984-85

Species	Hunting Season	Daily Limit	Possession	Season
Dove	Sept. 1-Sept. 29 (12 noon to sunset)	12	24	None
	Nov. 17-Nov. 24 (all day)	12	24	None
	Dec. 14-Jan. 15 (all day)	12	24	None
Crow	Thurs., Fri., Sat. of each week from June 1 to Feb. 28 plus Labor Day and Christmas Day	No restriction		
Deer				
Bow and Arrow	Sept. 10-Oct. 6 (*Eastern)	2	2	4
	Sept. 10-Oct. 6 and Oct. 15-Nov. 17 (*Western)	**2	2	**4
	Sept. 10-Nov. 10 (*Central and Northwestern)	2	2	4
Muzzleloading	Oct. 8-Oct. 13 (*Eastern and Western)	**2	2	**4
	Nov. 12-Nov. 17 (*Central and Northwestern)	2	2	4
Gun	Oct. 15-Jan. 1 (*Eastern)	2	2	4
	Nov. 19-Jan. 1 (*Central)	2	2	4
	Nov. 19-Dec. 1 (*Northwestern)	2	2	4
	Nov. 19-Dec. 8 (*Western)	**2	2	**4
Gun Either Sex and Special Either Sex	See *1984-85 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest*			
Black Bear	***Oct. 15-Nov. 17 and ***Dec. 10-Jan. 1	1	1	1

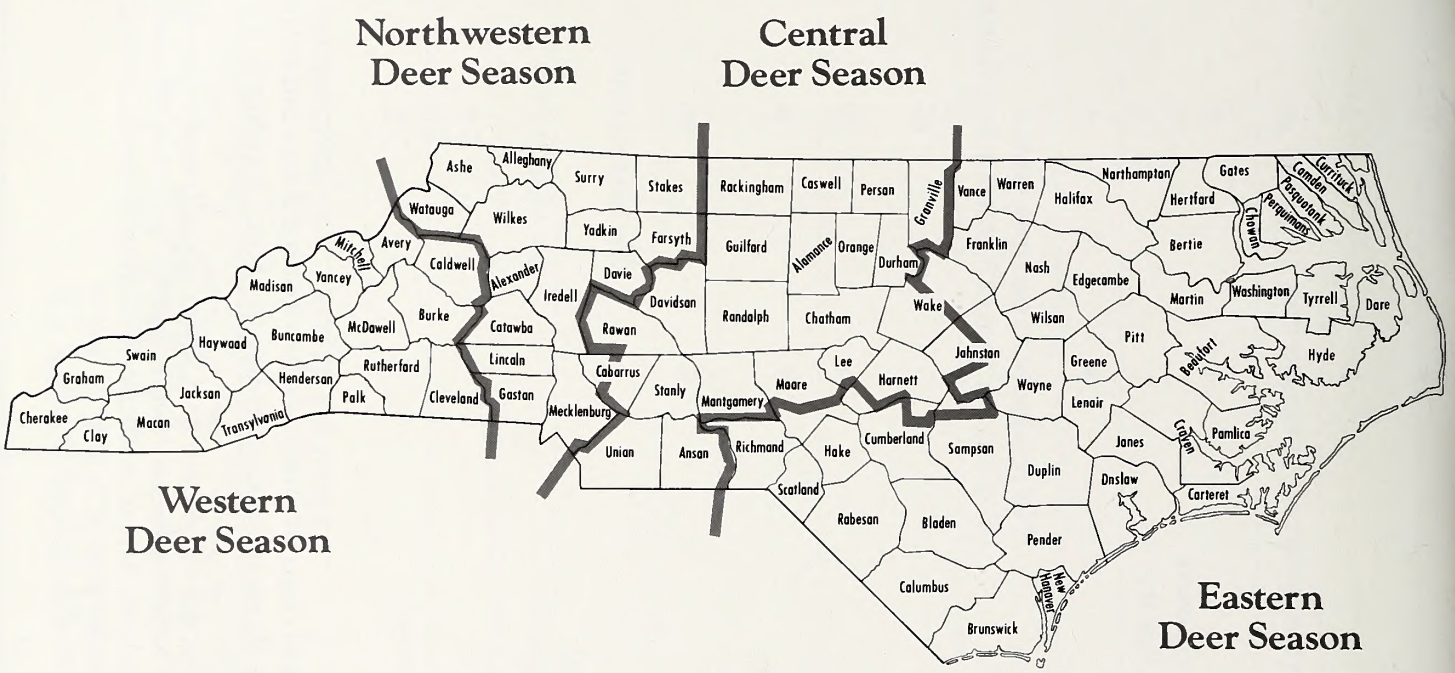
	***Nov. 12-Nov. 17	1	1	1
Wild Boar	Oct. 15-Nov. 17 and Dec. 10-Jan. 1	1	1	2
Gray Squirrel	Oct. 15-Jan. 31	8	16	75
Fox Squirrel	Oct. 15-Jan. 31 (Only in 17 counties. Season closed elsewhere. See *Regulations Digest*)	1	2	10
Ruffed Grouse	Oct. 15-Feb. 28	3	6	30
Raccoon and Opossum	***Oct. 15 (sunrise)-Jan. 31 ***Oct. 22 (sunrise)-Feb. 28	No restriction on opossum. See *Regulations Digest* for bag limits on raccoon.		
Rabbit	Nov. 17-Feb. 28	5	10	75
Rabbit - Box Trapping	Oct. 1-March 31	5	10	75
Pheasant - Nonnative Male Pheasant Only	Nov. 17-Feb. 1	3	6	30
Woodcock	Nov. 12-Jan. 15	5	10	None
Bobcat	***Dec. 10-Jan. 31 ***Dec. 10-Feb. 16	No restriction		
Fox	See *Regulations Digest*			
Groundhog	No closed season or bag limits.			
Wild Turkey Bearded Turkey Only	***April 10-May 8	1	2	2
Migratory Game Birds	Unavailable at this time; Federal regulations may be obtained by contacting license agent or writing N.C. Wildlife Resources Commission after October 1, 1984			

*See map on last page of this pull-out section for approximate boundaries of Eastern, Central, Northwestern and Western deer seasons; see *1984-85 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for complete details. For a copy of the *Digest*, write: N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Archdale Building, Raleigh, N.C. 27611.

**Some areas of Western season the daily limit is 1, possession 2 and season 2.

***Season and bag limits vary from location to location; see *1984-85 Regulations Digest*.

Boundaries for North Carolina Deer Seasons



North Carolinians are blessed with good hunting. Deer, black bear, wild boar and wild turkey are all found here, and are considered big game. There is also excellent hunting for squirrel, rabbit, quail, dove and grouse.

Licenses. The first thing any hunter needs is a license, and the best buy for the all-around outdoorsman is the sportsman's license. This license includes all appropriate permits for hunting big and small game and fishing. For those who only hunt small game, a statewide hunting license may suffice. However, permits for big game hunting and primitive weapons must be bought separately.

Perhaps the best option for the serious outdoorsman is to buy a lifetime license. Five of these lifetime licenses are available—including the sportsman's license for adults, youths and infants, and lifetime hunting and fishing licenses. The sale of these licenses supports the Wildlife Endowment Fund, with only the annual interest being used for wildlife conservation. Eventually, the fund will play a major role in supporting wildlife conservation in North Carolina. Licenses are available from license agents across the state, and information on lifetime licenses is available from license agents, Wildlife Commission employees, or by writing the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Game Lands. Finding a place to hunt is generally no problem. North Carolina has over 2 million acres of public hunting areas enrolled in its game-lands system. For the price of a game-lands use permit (which is included in the sportsman's license), sportsmen can hunt or fish on these public lands. Game lands are located throughout the state, and information is available free by writing: Game Lands Maps, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Tagging Big Game. Big-game hunters should also be sure to tag and report all kills. Big game—which includes deer, black bear, wild turkey, and wild boar—must immediately be visibly tagged at the scene of the kill. These tags are provided when hunters purchase big-game permits or sportsman's licenses. Then, the hunter must report the kill to a nearby wildlife cooperator agent. There are over 1,100 wildlife cooperator agents located throughout the state—watch for their diamond-shaped signs at country stores, sporting goods stores and other businesses. The cooperator agent will fill out a big-game kill report. A duplicate of this card is given to the hunter, and serves as a permit to possess the animal. Later, information from the big-game kill reports is used to determine harvests and other trends. Copies of the annual big-game harvest reports are available by writing to the Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Hotline. Wildlife belongs to everyone, and you may observe people breaking wildlife regulations in the field. If you observe a violation, call the Wildlife Commission's toll-free Wildlife Watch Hotline at 1-800-662-7137.

LIVING WITH CHIPMUNKS

Chipmunks are able to prosper in both urban and rural habitat, and nobody seems to mind that these striped bundles of energy are really rodents.

by Rick Estes

When I was seven, our family moved to Fontana Village. The little house sat on a steep hill that was home to several chipmunks. Like the chipmunks, I was small and curious. We had a lot in common.

There were lots of trees — big ones with acorns and beechnuts — and rocks, and great hiding places. Down back, below our wooded hill, the trees gave way to overgrown banks of blackberry briars, weeds and more rocky secret places, before blending into a large, mowed athletic field.

For me, it was a whole new world to explore and even though the chipmunks had probably been there a long time, they seemed just as intent as I was in checking out every nook and cranny. Except for my dad's bird dog, the chipmunks accepted our family with little alarm. They were interested in our comings and goings, but showed little fear of my brother and me unless we got too close to their burrows.

Since it was early fall, they were busy gathering acorns and other non-perishables for their winter stores. I didn't know it at the time, but they would be just about as busy at any other time of the year, except for the coldest weeks of winter.

The Eastern chipmunk, *Tamias striatus*, is a member of the squirrel family, and this familiar species is the only chipmunk native to the state. Chipmunks can be found in suitable habitat throughout the eastern U.S., except for the extreme south and southeast

Leonard Lee Rue III

"Although chipmunks inhabit small home ranges, and several may live close together, they are far from social animals. Chipmunks merely tolerate each other."

photographs by Leonard Lee Rue III

Nuts to you, but caviar to a squirrel. Chipmunks will eat such foods as earthworms, but they are especially fond of nuts. And at this time of year they are busy provisioning their burrows with stores of acorns, hickory and beech nuts.

coastal plain regions. This range is bounded by the fall line in the south, the timberlands of Canada, and extends just west of the Mississippi River. Other ground squirrel species are found in the western U.S. and in Europe.

The chipmunk's diet is similar to that of other squirrels, consisting mainly of nuts, fruits and seeds. Chipmunks, especially pregnant or nursing females and juveniles, eat some animal matter. This includes earthworms, insects and occasionally young birds, but the bulk of their diet is vegetable.

They are especially fond of acorns, hickory nuts and beechnuts, and tend to store only non-perishable foods and those that are not infested by any insect larvae. In his excellent book *Eastern Chipmunks: Secrets of Their Solitary Lives*, Lawrence Wishner observed that chipmunks don't discriminate between white oak or black oak acorns, but take the larger ones of both kinds and leave behind those with weevils. They transport this food to an underground burrow by means of their spacious cheek pouches. Each pouch can hold up to three or four large acorns, and when food is readily available in the fall, the pouches may be filled scores of times in a single day.

The result of all the gathering and storing is a remarkably well-provisioned underground home. The chipmunk's scientific name, *Tamias*, means "steward" and is very fitting. Most squirrels bury food by digging a small depression in the ground, covering it, and then either returning to it later or forgetting about it altogether. Unlike them chipmunks hoard food in their home burrows. Excavated chipmunk burrows have revealed many quarts of stored food remaining even after the winter was over. These burrows typically have a well-hidden main entrance about 2 inches in diameter with a tunnel that leads down 3 feet or so to a main chamber and some storage rooms. Other tunnels lead in different directions toward the surface of the ground, and there may be more than one exit.

Now what enterprising young lad wouldn't admire such a neat hideaway? A place like that, hidden away from the world, dark, cool and quiet, is the stuff dreams are made of. And stocked with the finest of foods, too! None of my favorite hideouts were ever so carefully designed, and peanut butter sandwiches don't keep that well.

In most of their range chipmunks spend at least a part of their winter in some form of extended rest, but they do not hibernate. Chipmunks, or ground squirrels, certainly do not hibernate in the way groundhogs do, or as bears do in more northern climates. These animals store their winter supplies under their skins in the form of a thick layer of fat, and usually do not arouse from their winter sleep until warmer weather.

An individual chipmunk may enter its burrow in mid-November and remain for several days in a state or torpid or semi-torpid activity. The date of its disappearance does not seem to have anything to do with the temperature or the angle of the sun, but may be an individual predisposition. The same chipmunk may remain active for almost all of the following winter.

Chipmunks usually remain underground for only a few days at a time. If the weather is not too bad, they will come out to look around, to relieve themselves, and then return to their underground castle where they literally sleep on their larder.

Even if their winter schedule is somewhat unpredictable, there are some normal cycles that apply to chipmunks over the course of a year. Here in North Carolina, where ground squirrels may be found from the Piedmont west, they begin to appear with some regularity in February. Males usually appear before females, and are ready to mate. Mating occurs during February and March and the young are born after a 31-day gestation period. They are tiny, hairless, blind and deaf, and weigh only about 1/6 ounce. These youngsters, usually four or five to the litter, emerge from the burrow after a month or more and are weaned and sent on their way after another 10-20 days. This leaves the adults ready to participate in another, less universal mating season in July.

Although chipmunks inhabit small home ranges of ½ to 1 acre, and several may live close together, they are far from sociable animals. Chipmunks merely tolerate each other. The territory a chipmunk will defend is actually much smaller than the range it uses during the course of a year, and probably consists of the area it can see while sitting upright at its burrow entrance. Encounters between two chipmunks in this smaller area are almost invariably won by the resident, with the visitor being chased away.

Wishner describes other chipmunk meetings that occur on more or less

"The chipmunk's scientific name, *Tamias*, means 'steward' and is very fitting. Most squirrels bury their food, but chipmunks hoard it in their home burrows."

Leonard Lee Rue III

Tiny fur balls, chipmunks remain in a torpid state for several days at a time in winter, although they do not hibernate as bears do in northern climates. Frequently they will emerge from their burrows and then duck back in again, sleeping on top of their cache of nuts. Even in warm weather chipmunks spend much of their time in their burrows, and are solitary by nature.

common ground in four stages. First they try to stare each other down. If that doesn't work, the more aggressive one will issue a threat by uttering a single chuck, or by lowered ears, narrowed eyes, raised hair and bared teeth. If the other chipmunk withdraws, it may be chased. If it doesn't run, a fight follows. Chipmunk fights are fierce, but usually last only a few seconds, and do not result in the death of the loser. After a brief tussle involving scratching and biting, one of the combatants breaks free and heads for home with the "winner" in hot pursuit. As the chase leads closer to the "loser's" home territory, the roles soon reverse. Now the "home area defense instinct" begins to change things, and the pursued quickly becomes the pursuer. If the two chipmunks live close together, this reversing chase may occur several times before one or the other tires.

There are really only two occasions for any degree of sociability between chipmunks, and even these are relatively short-lived. The first occurs during the spring and mid-summer matings, and again when the young are being reared. Females ready to breed attract the attention of one to several males, and a chase follows. The winning male mates with the female, and may be tolerated in her presence thereafter for an hour or so.

Little is known of early chipmunk postnatal care of the young because it takes place underground. After the young appear at the burrow entrance, the mother protects and instructs her youngsters for a period of days, but this ends soon as all young chipmunks in the area are driven away by the mothers and then by all the other adults.

This solitary independence should not be interpreted in human terms as cruelty or indifference to other chipmunks. It serves a very real function in keeping local populations in balance with the food supply. Since they are so proficient at gathering and storing food, it's easy to understand why too many chipmunks in a small area would be bad for the group's survival.

Actually, chipmunks are quite friendly and curious except at a feeding place or when threatened by a predator. Their natural enemies include hawks, rats, snakes, foxes, dogs and cats. Chipmunks have fared rather well near humans where residential areas have been built in naturally wooded habitat. This increases the amount of edge—the border between forest and open areas—that chipmunks need for their varied diet. An adverse side effect of increased contact with humans has been higher predation by domestic dogs and cats.

In good habitat, where food and shelter is plentiful, chipmunks can be fed in outdoor feeding areas without fear of their becoming pests. However, if they are fed when natural foods are scarce they may become depen-

Steve Maslowski

dent on the artificial source. This can lead to problems for the homeowner, and may support an abnormally high chipmunk populationthat will suffer when the feeding stops.

Average populations of chipmunks range from 2 to 30 animals per acre, but their presence is not as obvious as an equal number of birds or other small animals might be. Even though chipmunks are common in good habitat within their range, they may not be frequently seen. They spend much of their time underground because of their solitary nature, and to take advantage of the insulation qualities of their homes during the hottest and coldest times of the year.

When I was a kid at Fontana and decided to run away from home or simply head for my favorite spot in the woods, I always packed everything I thought I'd need for the duration. I didn't realize it then, but the chipmunks were much more self-sufficient. Now, when my nine-year old son crams all his necessities into a rucksack and heads for the woods, I understand what a natural tendency it is.

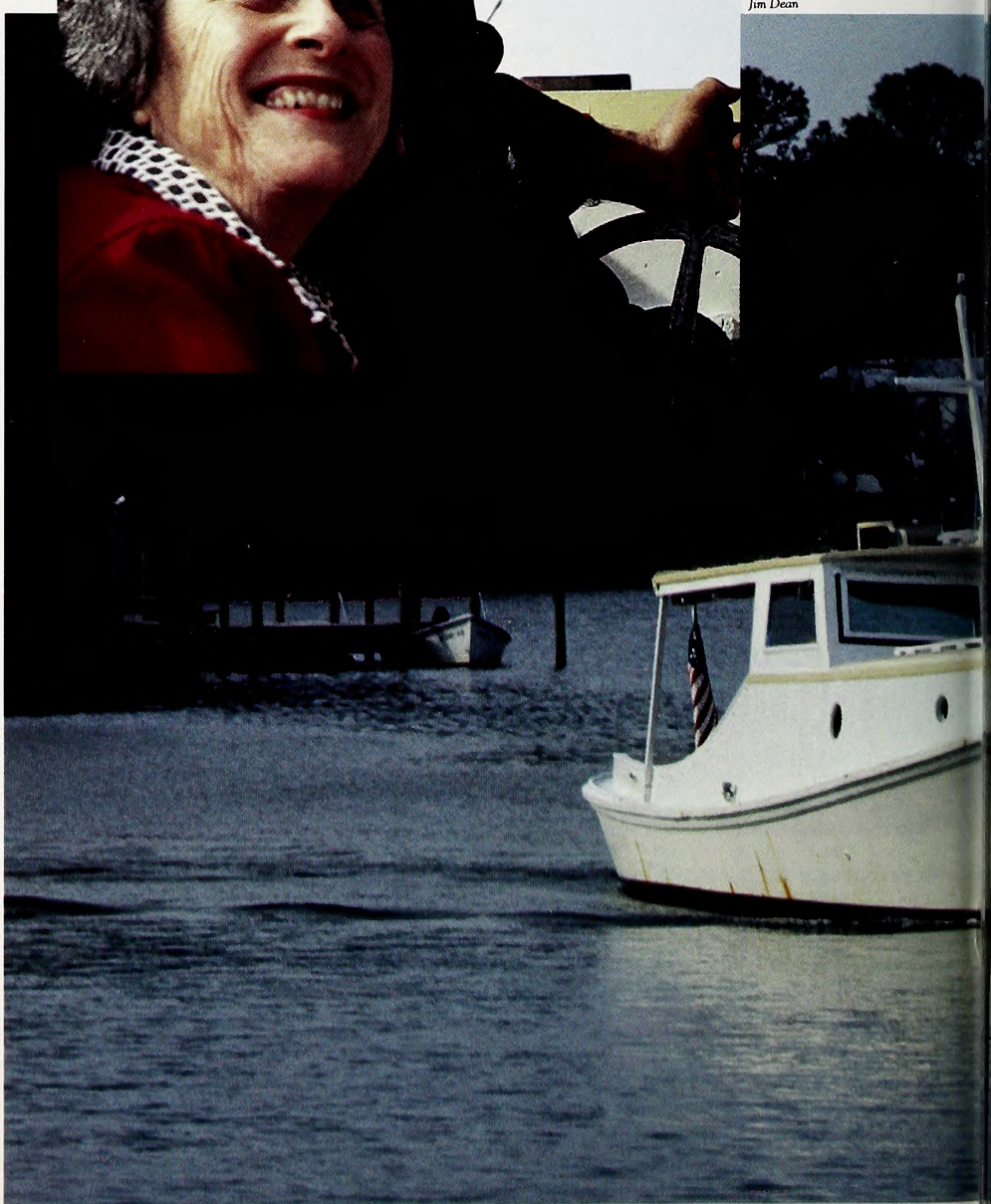
When you think about it, chipmunks have several admirable qualities. They're industrious but independent, self-employed and self-sufficient. They live close enough to other chipmunks to be able to accomplish the necessary functions of communication and reproduction, but they will not tolerate over-crowding. They look out for their own future and keep their noses clean. We could do worse than to pattern our lives after them. ⊠

Outdoors With The Simpsons

An Interview with
Bob and Mary Simpson

Over the years, Bob Simpson has shared his enjoyment and respect for the outdoors with many readers. Both Bob and his wife, Mary, are environmentalists, as well as avid hunters and fishermen.

Jim Dean



Jim Dean

Through his weekly columns in the Raleigh News & Observer, *Bob Simpson is well known to hunters, fishermen, environmentalists and other outdoor enthusiasts in North Carolina. Countless readers have been raised on Bob's gentle, yet thoughtful, view of nature and man's impact on it. Readers have also journeyed with Bob and his wife Mary as they explored a black-water creek, or hunted deer.*

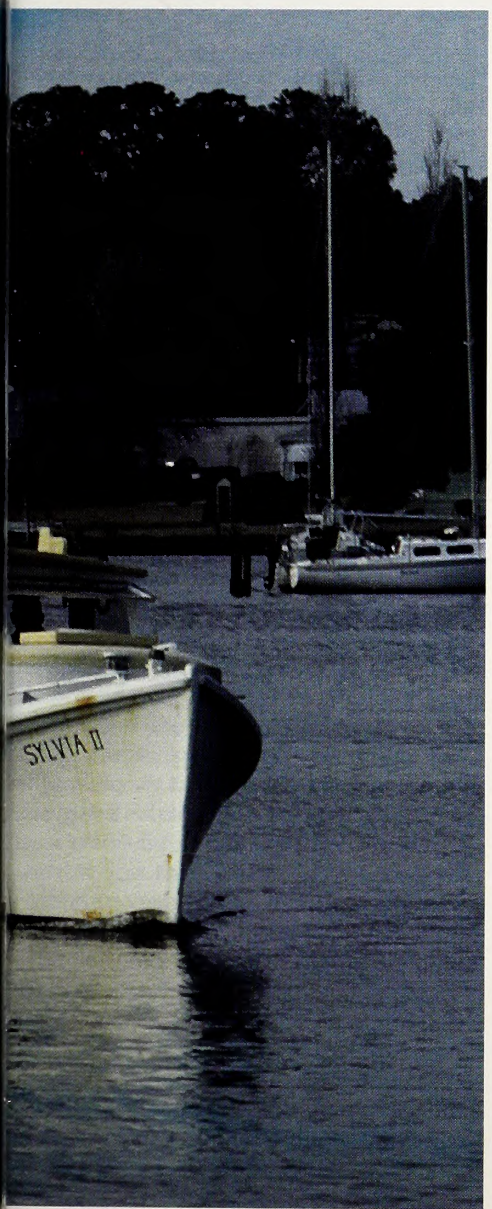
Only those who have never read Bob's columns will find it ironic that he and Mary are among the best-known hunting and fishing couples in the state and also environmentalists. Together, they have fought for and influenced many vital programs that protect and enhance our rich natural resources.

If you've often wondered whether Bob and Mary really live the life they write about, here's your chance to find out because Wildlife In North Carolina *visited them this spring. While mallards quacked for a free handout on the front porch of their small house on Termite Lane in Morehead City, and their 50-year-old boat, Sylvia, rocked invitingly at the dock a few feet away, we taped a long interview.*

Wildlife In North Carolina (WINC): You have been together for 37 years. How did you meet and how did you end up in North Carolina?

Bob: Mary's from Iowa, and I'm from South Dakota. I came here first with the Marine Corps, and I helped open up Bogue

Lawrence S. Earley



Field and Atlantic Field. We were flying out of there in the early forties. At the end of the war I went back to South Dakota. I met Mary; she was teaching at the Marine Corps Institute up in Washington, D.C.

Mary: So we were both in the Marine Corps, although not at the same station.

Bob: I met her on a train out of Chicago. We stayed acquainted. Then she got out of the service and I got out and we lost track of each other. I was going to South Dakota State College and I tried to get up with her in Iowa. She had said she lived in Woodburn, Iowa, but I couldn't find it on the map so I went to Woodbine and couldn't find her there and so more or less dropped it. I was walking down the street in Denver Colorado one time and I met her in front of the Blue Parrott Cafe. So we got married.

WINC: Were you interested in the outdoor life before you came to North Carolina?

Bob: Yes. We lived in Brookings, South Dakota and helped welcome the geese and the ducks when the ice broke.

Mary: When the breakup came, I guess in March, we'd go out to Oakwood Lakes, a few miles from where we lived. We'd hide behind the bluffs there and watch the geese. It was just beautiful to see. They were noisy and the lakes were just full of them.

Bob: Of course we'd watch them in the fall, too. And we'd do a lot of fishing, whatever was there. Float fishing, fly fishing. We perfected a style of fly fishing for carp. And if you want something exciting, that is real fishing.

Mary: Especially from one of those little rafts, you know. The so-called two-man rafts. You'd spin around in the bayous.

Bob: Then we came down here. I applied for a job at a local newspaper and they told me they would take me on a trial basis. So we packed up the Model A. I had inherited my younger brother to raise, so we brought him down here. When we got down here I worked at the newspaper for a short time and tried to find a place to live.

We were walking down the waterfront one day and heard that Captain Bill Ballou had an apartment. So I asked him about living somewhere, and he said, "Why don't you try living on a boat. Now, me and Aggie lived on a boat and man, that's the best living you can ever do." It sounded good. Later he said, "I just happen to know a good deal on a boat." I got hold of Mary and led her down. I think they were using a broom to paint blue paint on the top. Pretty rough looking. This was *Silver Spray*.

I said, "What do you think." Mary said, "I'm game if you are." So we bought it. This was the first time a Beaufort bank gave a loan to a private boat. It was 1949, the year we came to North Carolina.

We moved onto the boat, and I had absolutely no knowledge or experience in boats. I think it took Mary about a year before she figured out that twin engine. She figured one of those engines was a spare for the other. At first it seemed I never could get two of them running at a time. But I began to learn. After a time we moved the boat up Peltier Creek near Morehead City. There was nobody here at that time, and we lived completely off the land and water. We had no income. I tried this and I tried that and we figured that we lived on an average of less than $40 a month. We'd swap some crabs and catch some mullet and whatever we could do. And it was good living. It was fun. Baked beans and chigger bites. And fish and oysters, sweet potatoes and oatmeal. It was very, very basic.

WINC: Why did you decide to come here?

Bob: I had liked the place from my previous experience during wartime. I used to fly in dive bombers and we were training and doing some anti-submarine work and this sort of thing out of here. We'd take off for a rendezvous about 2 a.m. We'd be flying around and we'd watch the sun come up over the Banks and if you don't think that isn't beautiful! I have a mental picture right now of yellow barrier islands and green water a little farther off in the cloud banks, a ship coming in and out of the edge of that fog bank and the sun coming over the top of the clouds. I don't think that I will ever forget that. That and flying by full moonlight over the ocean, that's another mental picture I have. The country impressed me. It was beautiful. I also heard there was wonderful hunting down here.

I got back into the Marine Corps in 1950, during the Korean War. When I finished that I thought to myself, "I am not getting ahead. I've got to get some further

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Sylvia II *is the second of the Simpsons' boats. Launched on Valentine's Day, 1933, the* Sylvia II *has taken its present owners up and down coastal creeks and waterways, wherever there is something new to discover. Window flowers (above) decorate their creekside cottage outside of Morehead City.*

education." There were two places that I could go with the boat: one was to Washington, D.C., but I didn't like the idea of ice. And then a friend came by in a sailboat, and said "I'm going down to the University of Miami to go to school there." I said, "That's too fancy for me," and he said, "Not if you live on the boat."

Well, we took off down the Intracoastal Waterway for the first time. We went to the University of Miami, took journalism, oceanography and all this sort of stuff. I crewed on the sports fishing boat for the University a little while.

We got a job as caretakers of this island down in the Florida Keys. It was a beautiful place and the owner gave us a job to get rid of the mosquitoes. We got really acquainted with the skin diving in the Keys—this was in the early fifties—and we lived on lobster until we were sick of lobster. We fished for grouper and tarpon. I was trying to write. I was selling a little bit, but not much. We were just trying to survive.

Mary: I believe the first piece we sold was a little thing in the *Iron and Steel Institute News*. It was about the steel drums in Trinidad. Then we sold something to *Popular Mechanics* and other publications. Lots of how-to things.

WINC: Was it all as much fun as it sounds?

Mary: Yes, it was. I think that about the second or third year that we were here, we found out to our own satisfaction how well we could get along if we had to.

Bob: We came up here to Peltier Creek before Hurricane Donna hit. This was September 11, 1960. We were living aboard and watching the waves wash in and out of the houses and everything was fine. We were feeling sorry for everyone else and then this big barge broke loose and started down on us. When it did Mary went below and she came up with shoes, lifejackets and a flashlight. We figured that was all you needed. If you survive, how important is everything else? It's all accessories. We began to find out what the basics were.

WINC: You've also made some films as well as written articles and your recent book. Tell us about them.

Bob: This was in the late fifties and early sixties. We did "Marlin on the Mind," and then in 1970 we ended up in Montana doing "Escape to the High Country." Chet Huntley did the narration on that. We did all the filming and that was a beautiful movie. I think it is going to come out this year again. Some people are interested in it again. We did other films, too. In the sixties, you see, we were bumming around the country in our car and we would spend up to six months on the road, going from place to place. We've been writing and traveling ever since.

WINC: You go to Montana every year?

Bob: Well, usually we end up in Montana, and it's gotten to the place where it's home.

WINC: What time of the year?

Bob: Summer.

Mary: As early as June.

Bob: We stay there past Thanksgiving. There's a group called Back Country Horsemen and we are members of that group. One of the things we do is maintain forest trails, loading ramps, and access areas. We do Forest Service work. It might just be to put up a new outhouse or maybe hitching rails. We go out and do a lot of this. We're not paid for it. The Forest Service can use the money on something else.

And then we take people out there who have never been in that country and we set up a string of pack horses or mules. I can pack an animal and I can handle stock.

"I would say the best thing you can do is learn to live simply. Figure out what your goal is and go after it. You can do anything you want if you are willing to stick on that one trip."

When we were doing that movie, "Escape to the High Country," we spent the first month breaking mules—training them to trail, training to string them, lining them up, leading them up with a pack. You use six or eight mules to a string.

Mary: Yeah, that's the biggest thing, teaching them to go on the same side of the tree. That's really what you're doing.

WINC: You like the mountains as well as the sea?

Bob: I like both. To me the sea is similar to the desert in a way. The first time you go to the desert, it's nothing. It's just a big vast blank space. The sea is the same way until you once start getting acquainted with it. You start discovering the oysters and the crabs and the clams and the mollusks and the nets and the channels and the seaweed and the seabirds and it just grows. The more you understand it, the more beautiful it becomes. I can't think of anything that is any more beautiful. To be able to take a small boat and go up some creek and spend a day, a week, a month. Just watching the sun come up. Watching the otters swim by. Watching the pelicans. Going out and hooking a fish, shrimping. Go out at night floundering. Look at the eyes of the things that shine at night. It is just magnificent if you get out there. Listen to the seabirds at night.

Two or three years ago, as soon as things got a little bit dull around here, we took our present boat, *Sylvia*, down the Waterway. This Intracoastal Waterway is one of the most beautiful highways that you can imagine if you don't get in a hurry. I think that's the secret, really. This is a problem most people have. They get in a hurry. I can take a boat and go to Florida in, say, three or four days. But if you take 30 days....

Mary and I took an old microscope with us one trip. We anchored the boat near an inlet and we spent a week walking the shore, picking up seaweed and seeing what we could find in it. We were keeping count of the little starfish, the bubbleshells, the shrimp and the crabs and whatever else was there.

I guess we are taught to be in a hurry, but what is life anyway? Are you only interested in the goal? The goal is dying. That is not what I'm interested in. I'm interested in the trip.

I just think that people are a lot happier if they can just stop thinking of speed and distance—don't tell me how many miles you traveled. What did you see?

WINC: You and Mary are environmentalists and yet you are also sportsmen—hunters and fishermen. It's a combination a lot of people don't understand.

Bob: Well, maybe they don't get the complete picture. I think that the person who affected me the most on this issue was a guide we met up in Ontario where we were doing some moose hunting, a fellow by the name of Magnus. In his 60s then, he had been in the woods as a professional trapper since he came over from Finland when he was 16. He could out-run and out-climb just about everybody. The Canadian government had issued him a trapping permit and given him a territory. I said, "Aren't you going to hurt the beaver population by trapping?" And he said, "If I were a stock farmer would I be destroying my key brood stock? I have to know how many beaver there are in the

Lawrence S. Earley

The Simpsons spend several months traveling in the west each year, but they call North Carolina home. They love the coast and the variety of wildlife they find there. They are staunch defenders of the environment as well as lifelong sportsmen.

area, how many mink, how many fishes, I am going to manage this because this is a long-term thing. It isn't just a matter of going out and getting rich. I could cut the population down to almost zero overnight but I am interested in long-term use." He said, "I live with the animals. I think I have as much respect for these animals as you do."

I like that attitude. I guess it's like ranching. A rancher doesn't like to go out and kill cattle but that is part of the system.

Mary: I remember several years ago, Bob had a beaver parka made for me out in Montana before we discovered that I was going to have some surgery that was a whole lot more expensive than the parka. But anyhow I got a beaver parka and a friend of mine said, "Mary, how does it make you feel to wear a fur coat like that?" And I said, "It makes me feel warm and I plan to wear this the rest of my life. The beaver wore it all of his life and I am going to wear it the rest of mine." We do frequently hear comments about how can we reconcile hunting with our views on wildlife? The resource is what counts and if you take care of the resource there will be enough to go around.

WINC: What advice would you have for a young man or woman just getting out of school?

Bob: I would say the best thing you can do is learn to live simply. Figure out what your goal is and go after it and you can do anything you want if you are willing to stick on that one trip.

Mary: Bob, remember our friend, Pappy Joe Fulcher. He said, "You can have everything in life you want if you don't want everything you see."

Bob: The more things that you have to tie you down, the less you can discover around you and the narrower you become. I think that I would tell someone to find a subject they were interested in, study it deeply and shuck off all the rest of that stuff. Don't be afraid to try it. Just go. You ask most people to go hunting with you, and they say, "I can't." Why can't you? "Well, I got things to do." What have you got to do? "Well I don't know but I got things to do." Just go. Just do it.

WINC: You wouldn't change your lifestyle would you?

Bob: I don't think I would. I tell you, living this type of life, I've been able to go fishing in places other people can't go. I've hunted bear, deer, elk, sheep, goat, pheasant and antelope. I've experienced things that other people pay and pay and pay to do. I remember that fellow's boat I skippered for a while. He was a very wealthy man. He wanted me to go in with him and more or less become a junior partner in his business. And I said, "You have to realize that you work 12 months of the year and you get a couple of weeks off and you come down to Florida and I run you around in your boat. But do you realize the rest of the year I'm using your boat and you are paying my expenses? Do you realize you are working like hell to support me?" He said he hadn't thought of it that way. I turned the job down. I could have made money, but that wasn't what I was after. I was after having the fun that money gives to most people.

You don't need money to do these things if you go out and do it yourself. It's like the *Sylvia*. You don't have to have a modern fiberglass boat and have umpteen thousand horsepower. Get yourself something that you can go in. I just bought a 1970 Ford van. I could have bought a new '84 Ford van, $12,000 or $14,000, somewhere in there. I figured, I have $1,000 in this, that leaves me something between $9,000 and $10,000 worth of gasoline that I can burn and I can drive at 55 m.p.h. the same as I could an '84. And if I wreck the thing, I can leave it by the side of the road and what have I lost? I go buy another one. I can buy nine more of them for what someone else has paid for that new fancy model. That gives me enough money to drive to Alaska and Mexico and wherever I want to go.

WINC: What would you two do tomorrow morning if you got up and it was a pretty day and you could do anything you wanted to?

Bob: What I would like to do is take the boat and start a real slow cruise to... I don't know where.

Mary: Buffalo City?

Bob: That would be good, either north or south, I think north this time of year. South seems the wrong direction right now.

Mary: If you didn't go too far south you'd be all right.

Bob: Well one of the greatest pleasures I get is going out in the morning and seeing how much the leaves have unfolded. I've got some May flowers that are just coming up. I'm waiting for them. They should be up any day now. The first violets are beginning to show. We should have some blossoms in another two weeks. It's still awfully early.

I'd like to go out and watch things change.

—Lawrence S. Earley and Jim Dean

Carolina Profile *is a periodic feature in* Wildlife in North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.* ⊠

Hopes to Donate $40,000

Auto Dealer Promotes Wildlife

Written and Edited by Mark Taylor

The An-Ton Chevy-Olds-Buick dealership in Canton is helping to build a strong future for wildlife in North Carolina. Recently, Dan Robinson of Sylva, wildlife commissioner for District 9, and Greg Setzer, manager of An-Ton, met with wildlife enforcement officers and biologists to kick off the first An-Ton/North Carolina Wildlife Endowment Fund Drive at the An-Ton dealership.

"Our goal is to raise $40,000 for the fund in western North Carolina," said Setzer. "Sponsoring this drive is our way of ensuring a strong future for Tar Heel wildlife."

The Wildlife Endowment Fund was established in 1981 by the North Carolina General Assembly, and is approaching the $3 million mark. Only the interest from the Wildlife Endowment Fund is spent on wildlife programs, and as the fund grows it will play a large part in supporting wildlife conservation in the state.

During the four-month drive, employees of the An-Ton dealership are promoting and selling lifetime licenses, and in addition are enlisting youth groups, civic and sportsmen's organizations, and others in the effort. A drawing for a lifetime sportsman's license is also being held.

"With An-Ton's help and the support of the public we can give North Carolina a rich wildlife heritage," said Robinson. "Everyone can participate and benefit in this program."

Individuals may contribute to the Wildlife Endowment Fund by purchasing a lifetime hunting and fishing license, lifetime subscriptions to *Wildlife In North Carolina* magazine, and through tax-deductible contributions. More information on the Wildlife Endowment Fund is available from Wildlife Commission employees, license agents, or by writing to the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Jay Davies

Off and Running: *The An-Ton Chevrolet-Buick-Olds dealership in Canton recently kicked off a fund-raising drive for the North Carolina Wildlife Endowment Fund. Here, Greg Setzer (left), manager of the dealership, Dan Robinson, Wildlife Commissioner for District 9, and employees of the Wildlife Commission meet to kick off the effort.*

New Money Source Found

Orphan Mine Project Refunded

Streams in the high country of Mitchell, Yancey and Avery counties will run cleaner in the future thanks to the Tennessee Valley Authority. Since last spring, the agency has funded a program that has reclaimed 225 acres of "orphan" mines that were causing water-quality problems in the North and South Toe and Nolichucky rivers. These mines shut down before 1971 when regulations were adopted requiring abandoned mines to be reclaimed—which involves grading and seeding the sites with grasses, shrubs and trees.

In February 1984, *Wildlife In North Carolina* reported that TVA had funded a cooperative program that reclaimed over 250 acres of eroding mine sites in the three counties. This work was done in cooperation with state and local government agencies, soil and water conservation districts, and landowners. Funding for the project ran dry, but strong public support helped TVA obtain an additional $200,000 to fund the work that was done this spring and summer. Currently, a total of 480 acres of abandoned mines have been reclaimed.

The job is still not done, though, and approximately 125 acres of orphan mines continue to cause water-quality problems in the tri-county area. The outlook for reclaiming these sites is bright, however. The 1984 session of the North Carolina General Assembly recently appropriated $48,000 to finish the job, with $16,000 in matching funds or in-kind services to be provided by each county. To be eligible for this reclamation, the orphan mine must be causing off-site sedimentation and the landowner must agree to contribute funding or services towards the reclamation and must not disturb the reclaimed site for at least five years.

TVA-Jack Muncy

Healing Old Wounds: *Over 175 acres of eroding "orphan" mines in Mitchell, Yancey and Avery counties were reclaimed last spring and summer by the Tennessee Valley Authority and state and local government agencies. This helicopter is preparing to aerially seed an abandoned mine with grasses.*

"The reclamation of these orphan mines provides an excellent example of how government, citizens and industry can cooperate to solve a serious environmental problem," said Jim Simons, a mining specialist with the N.C. Department of Natural Resources and Community Development. "This project will not only clean up our waters, but result in good wildlife habitat in what once was a wasteland."

Over 68,500 Acres Protected

North Carolina Wilderness Bill Becomes Reality

After five years of controversy, North Carolina now has an additional 68,500 acres of designated wilderness in its national forests. Recently, the North Carolina Wilderness Act (HR 3960), sponsored by Congressman James McClure Clarke and supported by the entire North Carolina congressional delegation, was approved by Congress and signed into law by President Ronald Reagan. The Act adds 11 areas to the existing wilderness system on the Nantahala, Pisgah, Uwharrie and Croatan national forests.

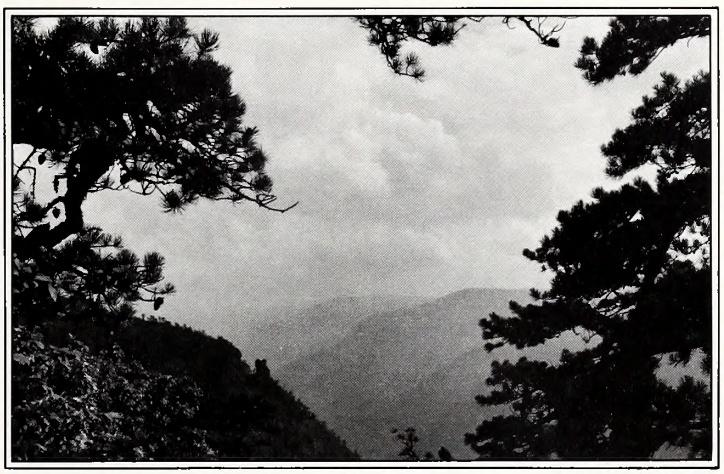
These lands had previously been identified as meeting wilderness criteria under the federal RARE II (Roadless Area Review and Evaluation) study, which was completed in 1979. National wilderness legislation based on RARE II quickly stalled in Congress, however. After a long, bitter struggle failed to reach a nationwide consensus on wilderness lands, individual states began introducing their own wilderness bills. In addition to North Carolina, wilderness bills have been adopted for Vermont, New Hampshire, Wisconsin, Missouri, Oregon and Washington, and about 30 other state bills are pending.

Wilderness on national forests is open to all types of non-motorized recreation — including hunting, fishing, hiking, camping and other activities. However, the use of motorized vehicles, construction of roads, developed campgrounds, logging and mining are prohibited. The new wilderness areas adopted under the North Carolina Wilderness Act — which are identical to the RARE II recommendations made in 1979 — are as follows:

- Joyce Kilmer-Slickrock in the Nantahala National Forest (2,980 acres);
- Ellicott Rock in the Nantahala National Forest (3,680 acres);
- Shining Rock in the Pisgah National Forest (5,100 acres);
- Linville Gorge in the Pisgah National Forest (3,400 acres);
- Southern Nantahala in the Nantahala National Forest (10,900 acres);
- Middle Prong in the Pisgah National Forest (7,900 acres);
- Birkhead Mountains in the Uwharrie National Forest (4,790 acres);
- Sheep Ridge in the Croatan National Forest (9,540 acres);
- Pond Pine in the Croatan National Forest (1,860 acres);
- Pocosin in the Croatan National Forest (11,000 acres);
- Catfish Lake South in the Croatan National Forest (7,600 acres).

In addition, five tracts totaling almost 27,000 acres will be retained as "wilderness study areas" for possible future wilderness designation. These include Snowbird in the Nantahala National Forest (8,490 acres), Overflow Creek in the Nantahala National Forest (3,200 acres), Craggy Mountain in the Pisgah National Forest (2,380 acres), Harper Creek in the Pisgah National Forest (7,138 acres), and Lost Cove in the Pisgah National Forest (5,708 acres).

"A report on these study areas must be submitted to the head of the Forest Service and Secretary of the Department of Agriculture within three years," said Walt Rule, public information officer for the U.S. Forest Service in North Carolina.



Ken Taylor

A Heritage Preserved: *Linville Gorge was just one of the areas receiving additional protection when President Reagan signed the North Carolina Wilderness Act. This legislation added 68,500 acres in 11 national forest areas in North Carolina to the wilderness system.*

"Until then, these lands must be managed so that their character and potential for inclusion as wilderness are maintained. Congressional action would be required to add them to the wilderness system."

The addition of the new wilderness areas gives North Carolina a total of 100,127 acres of designated wilderness in national forests in the state, or about nine percent of the national forest system.

Changes Made

Wildlife Calendars Available Soon

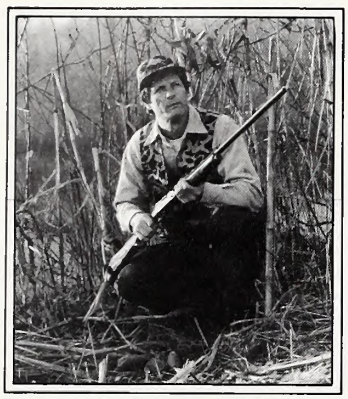
The 1985 North Carolina Wildlife Calendar will soon be available — with some changes. Instead of running from September through August, this year's calendar will run on a standard calendar year — from January through December of 1985.

"We decided that running this publication on a standard calendar year would better serve the public," said Sid Baynes, chief of the Wildlife Commission's Division of Conservation Education which produces the calendar. "Many people requested that we make this change, especially since the calendars are very popular as Christmas gifts."

This year's calendar features an outstanding selection of wildlife artists — including Larry Barton, Bob Dance, Duane Raver, Bob Herr, Jake Taylor and Joe Seme. The format of the publication has also been enlarged to 10¼ by 14 inches, and the popular "Almanac" section — containing information useful to sportsmen — will be included.

The 1985 North Carolina Wildlife Calendar may be ordered by writing Wildlife Calendar, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Sportsmen Honored



Curtis Wooten

A Celebration Of Sport: *Over one million North Carolinians hunt and fish, and their contribution to conservation will be honored on National Hunting and Fishing Day on September 22. The theme of this year's event is "Share The Outdoor Tradition," and many wildlife clubs across the state will host public programs.*

Plans Are Available

Reader Wants To Build A Sailing Sharpie

Dear Sirs:

I enjoyed your article on traditional wooden boats, and am thinking of building a sharpie with the help of my two daughters as a family project.

However, I need to know more before I begin converting pine to sawdust. Could you tell me where I could obtain plans for a sharpie and learn more about boatbuilding?

—*Al Kerensky*
Raleigh

You are a brave man, indeed. We recommend the following information sources for aspiring boatbuilders.

Hampton Mariners Museum
120 Turner Street
Beaufort, N.C. 28516
(boat plans, including a sharpie)

Magazines:

National Fisherman
21 Elm St.
Camden, Maine 04843
Subscriptions $18 year, published monthly.

Small Boat Journal
Box 400
Bennington, Vermont 05201
Subscription $12 year, published bi-monthly.

Wooden Boat Magazine
P.O. Box 78
Brooklin, Maine 04616
Subscription $18 year, published bi-monthly.

Books:

Chapelle, Howard. *Boatbuilding — A Complete Handbook of Wooden Boat Construction*. Published by W. W. Norton Co. of New York.

Chapelle, Howard. *American Small Sailing Craft*. Published by W.W. Norton Co. of New York.

Gardiner, John. *Building Classic Small Craft*. Published by International Marine Publishing Company, 21 Elm St., Camden, Maine 04843.
Includes one chapter on building a sharpie; most of the book is devoted to traditional boats of the Northeast.

Horsepasture River Meeting Set

Citizens will soon have an opportunity to express their feelings about a controversial hydroelectric project proposed for the scenic Horsepasture River in Transylvania County. A public meeting on the issue will be held on Monday, September 24 at 7 p.m. at the Transylvania County Courthouse in Brevard. The meeting is being sponsored by the Transylvania County Board of Commissioners and the Asheville regional office of the N.C. Department of Natural Resources and Community Development.

The Horsepasture River hydroelectric project, which is being proposed by Carrasan Power Company, is seen by many as a test case for instream flow needs in North Carolina. Water would be removed from the top of the Horsepasture Gorge, piped to a generator, and would ultimately be released two-and-a-half miles downstream.

Four spectacular waterfalls — including Drift, Rainbow, Stairway, and Windy falls — are found within less than a mile in the portion of the gorge that would be affected. Opponents of the project fear that the proposed withdrawal would reduce instream flows to the point where the waterfalls would be severely reduced. In addition, portions of the proposed pipeline and the power house would be located on a state natural heritage area that includes Windy Falls and 250 acres of land below the falls on both sides of the gorge.

Sportsmen are also concerned about impacts to fish populations. The proposed withdrawal would retain "survival" conditions for brown trout, but would not maintain optimum spawning conditions.

The Horsepasture Gorge is popular with fishermen, tubers and hikers. Portions of the gorge are owned by the U.S. Forest Service.

The *NEW* North Carolina Wildlife Calendar

We're wild about our new calendar and we know you will be too!

All the outdoors information you have come to expect plus beautiful wildlife art prints each month.

The 1985 calendars will be arriving soon. Order today and be among the first to receive one.

And remember, the North Carolina Wildlife Calendar now makes the perfect gift for all the outdoors enthusiasts in your life.

Please send me ____ N.C. Wildlife Calendars at $6.00 each $_____
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All orders must be prepaid. We do not bill. A $10.00 charge will be made on returned checks. (N.C. G.S. 25-3-512).

ORDER TODAY

Who Is That Masked Man

Wildlife Officer Is Riding The Ridges

Foster Harrell, a wildlife enforcement officer in Henderson County, and his horse were moving silently up the trail, trying to get close to an angler to make sure he was fishing legally.

"The angler was totally engaged in trying to catch a trout," said Foster with just a hint of a smile. The forest was quiet and except for an occassional call of a songbird, the only sound was the bubbling creek. "We were about 30 feet from the angler when my horse snorted and that fisherman nearly jumped out of his skin. He probably thought he was about to be eaten by a bear."

Foster has experienced other humorous situations since he started patrolling the remote areas of Henderson County by horseback. "Most people are accustomed to seeing a wildlife officer on foot or in a vehicle and they are not expecting me to sneak up on horseback," he added. "Many areas in western North Carolina are remote and can only be patrolled on foot, and this sometimes places the officer at a disadvantage because the area he can effectively cover is greatly limited."

Members of the Land-Of-Sky Chapter of Trout Unlimited in Asheville have helped rectify this situation. The chapter has frequently assisted the National Forest Service and Wildlife Commission to enhance trout habitat, develop effective fishing regulations, and assess new trout-management techniques.

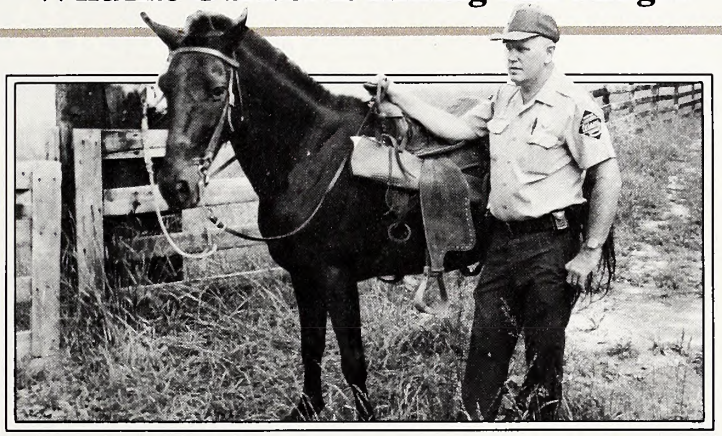
The chapter knew that a few greedy poachers could undo all they had worked for, and decided to see if there wasn't some way they could assist the wildlife officers in their work. "The best idea we could come up with was for the officer to patrol the area on horseback," said Chapter President Richard Phillips. The Wildlife Commission, however, lacked the funds to purchase and care for a horse. "No problem," said Phillips, "Trout Unlimited will buy one for your use and we will even pay for all the care and upkeep needed to keep the animal in top condition."

After two years of fund raising, the Land-Of-Sky Chapter purchased their horse and Officer Harrell is frequently seen in the saddle patrolling South Mills River and other remote areas of western North Carolina. "Jet," as Officer Harrell has named the horse, stands 12 and ¾ hands high and "is extremely well mannered and will go anywhere through the woods," says Harrell.

A working horse and rider have to act as a team. When Officer Harrell dismounts to question sportsmen, he doesn't have to divert his attention to Jet or be concerned that the horse might wander off. "Jet is always right where I left him," says Harrell, "and when I want to leave the trail and cut through the woods, he never shows any sign of reluctance."

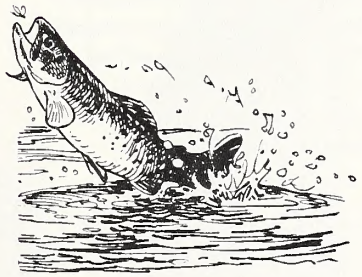
Thanks to the support of the members of the Land-Of-Sky Chapter, Officer Harrell and Jet are well on their way to stopping poaching in western North Carolina.

—Jay Davies



Jay Davies

Riding The High Country: *Wildlife enforcement officer Foster Harrell and his new horse, Jet, often patrol remote trout streams together in Henderson County. The Land-of-Sky Chapter of Trout Unlimited in Asheville bought the horse to help improve enforcement in remote areas.*



The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on May 31, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	7,976	$2,353,776.02
Lifetime Hunting License	92	16,211.87
Lifetime Fishing License	398	66,419.42
Lifetime Subscriptions to Wildlife in N.C.	280	31,747.82
Contributions	—	38,180.78
	Fund Total:	$2,506,335.91

Worth All The Ammo

Grilled Doves Fit For Feast

Some folks based in Freeport, Maine, who have been running an enterprising little mail-order business catering to outdoor-minded folks for the last half-century or so recently came out with a wild game and fish cook book. The *L.L. Bean Game and Fish Cook Book* was written by Angus Cameron and Judith Jones, and in the best Bean tradition it is a quality product. Any serious hunter or fisherman who wants to get the best from the fruits of his days afield would find it a welcome addition to the kitchen library.

The book has a number of dove recipes, and one—grilled doves—is similar to a favorite recipe that I've used for years, but has a few embellishments that I consider improvements. If you like charcoal-grilled prime steak, I think you'd enjoy grilled dove—the taste and texture are very similar.

Grilled Doves

½ cup olive oil
2 cloves garlic or shallots, minced
1 teaspoon dried rosemary, crumbled
salt and pepper
6 doves split down back and flattened or 6 dove breasts

Mix the oil, garlic or shallots, rosemary, and salt and pepper and brush over both sides of the birds. Grill the birds 4 to 5 inches from the hot coals for 4 to 8 minutes on each side, depending on how well done you prefer your meat. Be sure to baste them several times while cooking. Dove breasts are tender and moist when cooked to a hot-pink center, which takes about 4 minutes on each side. Be careful not to overcook—dove quickly becomes dry and tasteless when cooked beyond medium using dry heat.

The utilization of wild game is one of the marks of an ethical hunter, and a good wild game cook book can add much spice to the kitchen. The *L.L. Bean Wild Game and Fish Cookbook* was published by Random House and can be found in many bookstores or can be ordered for $19.95 from L.L. Bean, Inc., Freeport, Maine 04033.

—*Curtis Wooten*

Sick Eagle Finds A Friend

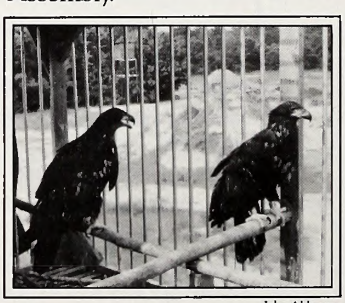
Four bald eagles released last summer at the Lake Mattamuskeet National Wildlife Refuge in Hyde County had a surprise when the cage doors opened—another eagle was waiting for them.

"A local farmer had called the refuge about a sick bird in one of his fields," said Melinda Welton, endangered species project leader for the N.C. Wildlife Resources Commission. "Larry Ditto, refuge manager, went over and picked the bird up and brought it back to the refuge. He found it was a young eagle that was literally starving to death.

"This is not uncommon with young birds of prey. The bird was nursed back to health and released near the cages holding the other eagles. Plenty of food was provided for the wild bird, and it stayed in the area. When the four caged eagles were released, the wild bird joined them and they stayed together. All the birds are doing fine. The wild eagle probably came from a nest in Hyde County—this year we had the first successful nesting attempt in the state since 1971."

This was the second bald eagle release to be conducted at the Lake Mattamuskeet National Wildlife Refuge. Last year, three bald eagles were released from the site. Biologists hope that the birds will return to nest in the area when they mature in four to five years. Eventually, they hope to establish a nesting population of 30 bald eagles on the North Carolina coast.

The bald eagle project is a cooperative effort of the Wildlife Commission and the U.S. Fish and Wildlife Service, and is supported by the North Carolina Nongame and Endangered Wildlife Fund. This fund is supported by tax-deductible contributions and the Nongame Wildlife Tax Checkoff, which was recently enacted by the North Carolina General Assembly.



John Alderman

Please Release Me: *The four bald eagles held in two cages at the Lake Mattamuskeet Wildlife Refuge had a surprise last summer when the cage doors opened—an unexpected visitor was waiting for them.*

Calendar Of Events

September 8-16
French Broad River Week. Includes river walks, float trips, litter cleanups, educational displays, and other activities to promote public awareness. For more information contact Land-of-Sky Regional Council, Bill Baker, 25 Heritage Drive, Asheville 28806.

September 15-16
Third annual Currituck Wildlife Festival at the Currituck County High School in Barco. Sponsored by the Currituck County Wildlife Guild, the show features exhibits and sales by wildlife artists, decoy carvers, collectors and photographers. Also, state championships for duck and goose calling will be featured. For more information contact the Currituck Wildlife Guild, P.O. Box 91, Shawboro, N.C. 27973.

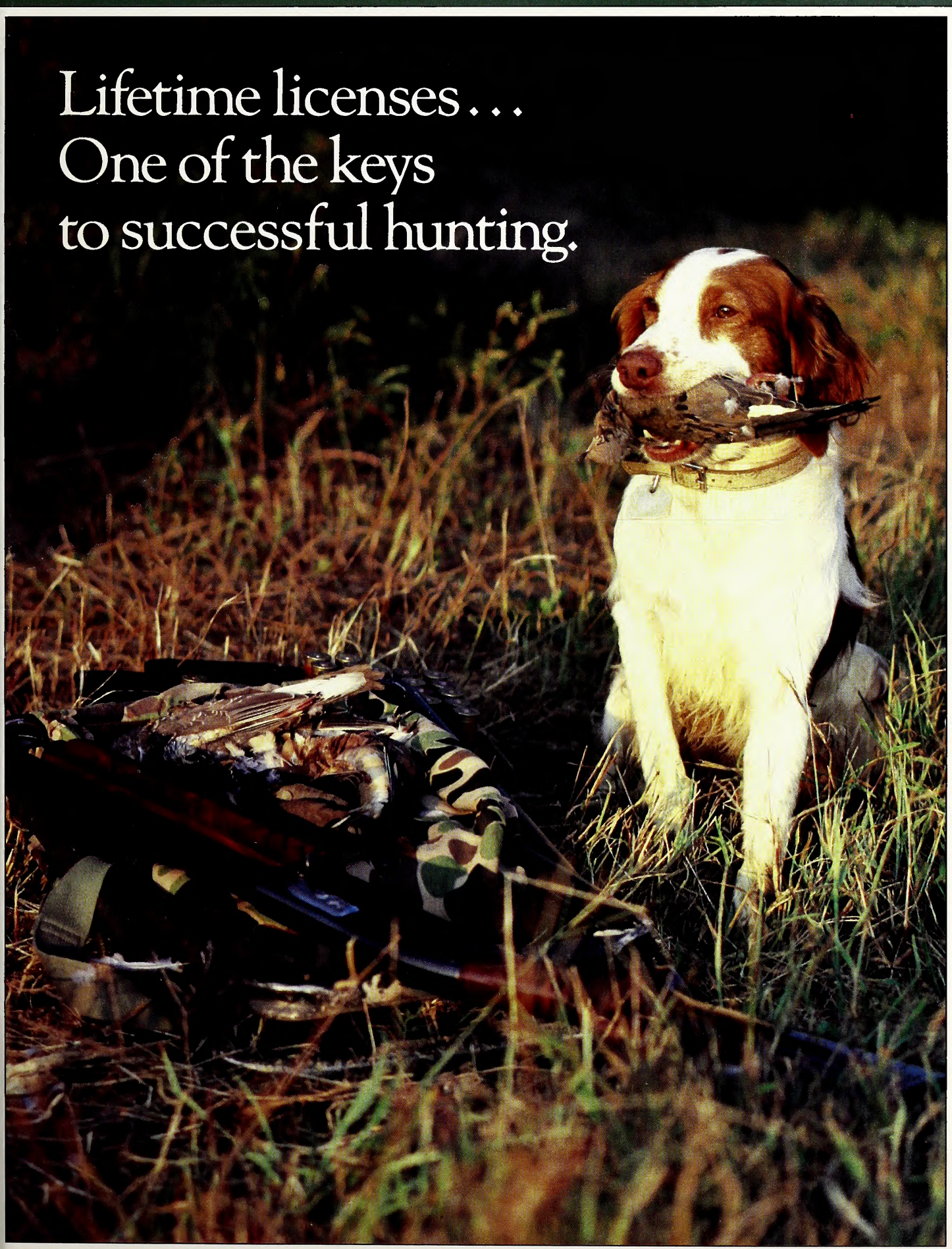
September 19-22
Sixth annual Atlantic Beach King Mackerel Tournament. For more information contact the Atlantic Beach Fire Department, P.O. Box 8, Atlantic Beach, N.C. 28512.

September 22
National Hunting and Fishing Day Expo at the Roanoke Island Marine Resources Center in Manteo. Sponsored by the Center and the Pea Island National Wildlife Refuge, the expo features arts, crafts, films and demonstrations.

For more information contact the Roanoke Island Marine Resources Center, P.O. Box 967, Manteo, N.C. 27954.

September 20-23
Wrightsville Beach King Mackerel Tournament. For more information contact King Mackerel Tournament, P.O. Box 674, Wrightsville Beach, N.C. 28480.

September 29-30
Traditional Wooden Boat Show in Beaufort. Features traditional wood boats of North Carolina, old boat race, and other events. For more information contact the Hampton Mariners Museum, 120 Turner St., Beaufort, N.C. 28516.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to successful hunting.

Cool Drink

A gray squirrel pauses at a
woodland pool for a few sips.

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Camp Cooking Catastrophes

by Jim Dean

Back when I used to do a lot of camping and outdoor cooking (note use of the past tense), I was a sucker for a crisp, fall day. I could picture myself camped along some river where the smoke from my cookfire curled against the misty mountains and the air was laden with the rich aroma of perking coffee and sizzling bacon. I went to a lot of trouble to bring that mental picture into the world of reality, but after years of failure, I have decided that the whole image of carefree campfire cooking is a myth.

Certainly the Boy Scouts unwittingly played their part in this deception. At the age of 10—before there were such things as centerfolds—I would spend hours studying the Boy Scout Manual captivated by step-by-step illustrations showing how to make a proper cookfire, prepare pemmican or construct various utensils out of green sticks and vines. I recall trying to make a reflector oven out of tin cans which (the plans said) could be quickly snipped and folded into shape. I got off easy on that one—only seven stitches.

illustration by David Williams

Then, there was the time I saw an illustration in *Boy's Life* showing how to make bannock by twisting dough around a stick and baking it over a fire. I'm not sure what I expected, but the resulting spiral of bread had the shape and resilience of a rhododendron walking stick. I suppose you could have nibbled on it while you hiked, but you'd have needed the dentalwork of a beaver.

I was especially vulnerable to the image of a coffee pot and a kettle hanging from a branch supported over a fire by two forked sticks. Even before I'd pitch my tent on a camping trip, I'd grab my trusty hatchet and head for the nearest woods to seek out forked sticks. You'd be surprised how much variance there is between forked sticks. Over the years, I probably defoliated more forests than agent orange looking for a perfectly matched pair.

Of course, I knew campers who carried a sleeping bag full of candy bars, square nabs and cans of pork n' beans to tide them over between meals, but that was cheating. Those of us following in the footsteps of Daniel Boone and Jeremiah Johnson wanted hot meals. Let the sissies hide in their tents and eat candy bars; I wanted a real meal cooked over a fire—hot dogs charred beyond recognition or marshmellows that burned with a handsome blue flame.

Actually, I recall one culinary triumph during those early years. My mother took a tin coffee can, washed it thoroughly and filled it with layers of onions, hamburger and sliced potatoes. She added salt, pepper and a bit of water, then put the tin top on it. "Put this in the fire for 30 minutes, and when you take the top off it's ready to eat," she told me. "It's called a coffee can casserole, and it's foolproof."

She was, as always, absolutely right. For once, I enjoyed a fine meal despite the ashes which fell into the can when I pried open the lid and the third degree burns on both hands.

Similar disasters plagued me through scouthood into adulthood. There was the time a plastic spoon melted in a pot of tomato soup, a mishap that was discovered only after enough soup had been eaten to reveal the unmelted tip of the handle in the bottom of the pot. Or the time we poured a dozen eggs into a red hot skillet and were astounded to see a giant yellow bubble form instantly and burst just as we dove for cover.

You don't see stuff like that written in camp cooking literature. They don't warn you about exploding eggs or plastic spoons. Nor do they ever show anyone trying to cook in a monsoon while huddled around a smoking hunk of soggy pine under a quivering tent fly that is rapidly filling with several hundred gallons of water.

I know you're nodding your head and thinking, "He knows, he knows." And you're right, I do know. I think I've experienced every outdoor cooking disaster known to mankind, and that doesn't include eating some of the results. Ever had a fried sardine? You don't want to know how that came about.

Anyway, I was reminded of all this when I received a promotional leaflet from a tent manufacturer. The literature extolled the joys of camping, and included a piece on camp cooking which began with this statement, "Camp cooking can be a vacation from kitchen chores with the right preparation..."

Who do those folks think they're kidding? Bet that writer never ate a fried sardine.

October, 1984
Volume 48, Number 10

State of North Carolina
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Department of Natural Resources
and Community Development

James A. Summers/Secretary

North Carolina Wildlife Resources Commission

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M. Woodrow Price/Vice-Chairman/Gloucester
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WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *This handsome whitetail with the rut-swollen neck would be a fine trophy for any sportsman. Wildlife photographer, Leonard Lee Rue III, caught this buck in the open with his camera.*

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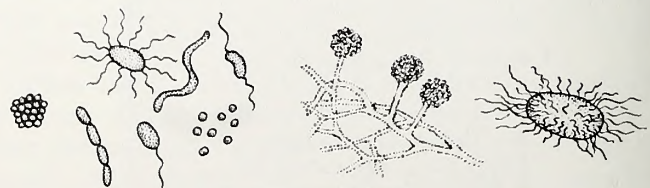
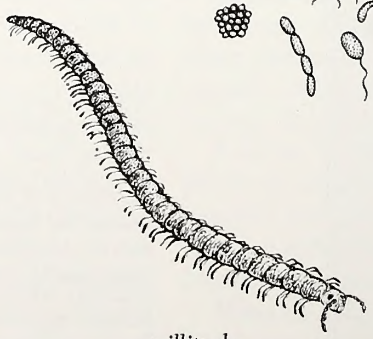
Tiny springtails eat holes in the dead leaves while the carnivorous centipede searches for an unwary springtail. Leaf, springtail and centipede form one of the many food chains in the soil ecosystem. As plants die and leaves fall from the trees, a vast number of animals and microorganisms help to turn this dead vegetation into soil.

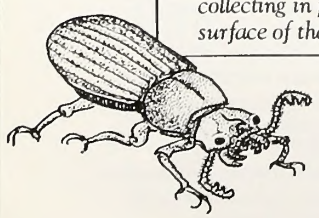
Some soils are more tightly packed than others, but a microscopic view of even these soils would show a world containing crevices and air spaces through which a host of tiny creatures crawl, feed, and carry on their lives. The soil consists of tiny pieces of rock mixed with organic material with water collecting in pools or coating the surface of the soil particles.



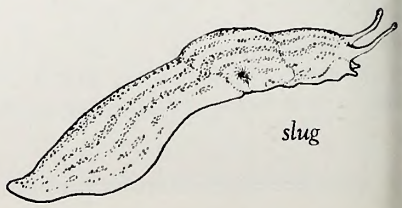
bacteria and fungi



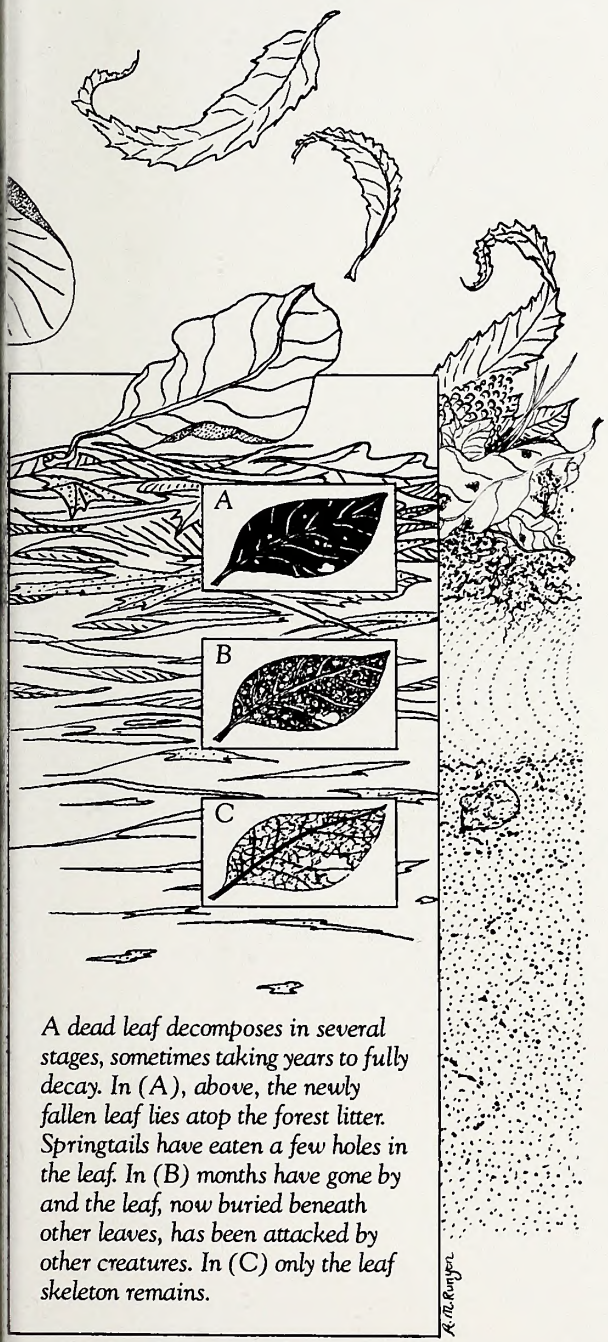
millipede



beetle



slug



A dead leaf decomposes in several stages, sometimes taking years to fully decay. In (A), above, the newly fallen leaf lies atop the forest litter. Springtails have eaten a few holes in the leaf. In (B) months have gone by and the leaf, now buried beneath other leaves, has been attacked by other creatures. In (C) only the leaf skeleton remains.

snail

From microscopic bacteria to the pint-sized snail, the world of the soil teems with plants and animals whose job is to help in the work of decomposition. Even the woodcock and the mole are linked in this great endeavor.

The Soil Makers

written by Lawrence S. Earley / illustrated by Anne Runyon

Is that a tiny sign I see as I walk through the autumn woods? — "Silence: Soil making in progress." Inclining my ear to the ground, do I hear the sounds of tiny picks and shovels?

Well, no — that's just a writer having fun. But though there are no sounds or lettered signs to mark the progress of soil makers beneath our feet, they are there all the same: grubs, snails and slugs; earthworms, beetles and ants; millipedes and centipedes; mites and springtails; pseudoscorpions and spiders. And those are only the things you can see — some just barely, of course. Position a teaspoon of soil beneath a microscope and a vast domain teeming with bacteria opens up before you. Long white roots — fungi, the underground parts of mushrooms — thread through this underground landscape.

All these living plants and animals are members of the soil ecosystem, partners in a single great activity: the decomposition of dead organic matter and the release of trapped nutrients to live plants. Each year thousands of pounds of dead leaves fall on an acre of hardwood forest. There are thousands of additional pounds of dead wood, bark and roots, plus the rotting remains of fruits and flowers — all are removed over time.

How do these creatures perform this magic? Not with rakes, certainly, but by doing what comes natural to them — eating and being eaten. Let's follow a sweet gum leaf through its decomposition. As the dead leaf spirals to the ground it is already aswarm with fast-growing bacteria that soften the leaf and make it easier for the plant eaters in the soil to begin their own feeding.

At first, the larger springtails go to work, eating "windows" into the leaf surface. Gradually the leaf becomes riddled with these holes, and now smaller and smaller springtails, mites and millipedes work over the pieces, crushing them into even smaller pieces and adding bits of their own excrement to the mixture. As the leaf becomes skeletonized, more bacteria colonize the edges of the holes, attracting creatures that feed on them, and thus accelerating decomposition.

Earthworms pull pieces of the leaf into their burrows or eat the soil containing leaf remains, excrement and mineral matter. Sometimes they deposit their own excrement at the surface of their burrows in the form of tiny crumbs of earth that are very rich in bacteria. Earthworms are responsible for mixing inorganic particles together with plant and animal parts. They also bring deeper soil to the surface and mix the soil thoroughly.

Eventually the plant eaters have reduced the leaf to its woody skeleton, and the leaf parts have been worked into the soil over and over again by earthworms and millipedes. At the same time, the carnivores have been busy. Beetles have dismembered ants; spiders have trapped beetles; and centipedes have hunted for springtails through the subterranean caverns of the soil. These carnivores are not directly related to the work of decomposition, but they help indirectly by curbing the populations of plant eaters.

Reducing the leaf to fragments is only the preliminary event in the work of decomposition. The billions of bacteria and fungi in the soil are the real decomposers. They release nutrients trapped in dead plants — the molecules of carbon, nitrogen, sulfur and others — and make them available to growing plants. Fungi are especially good at breaking down tissue that resists bacterial action.

The soil where these dead plants and leaves are decomposing is rich in nutrients, and in the fall as nature shuts down her growing operations against the coming of the cold, these nutrients will remain in the soil. In the spring, as the sun warms the earth and our green plants and trees start to pump water once more, the nutrients will be drawn up into the plants. And life will begin all over again. ⊠

HUNTING THE RUT

Love is blind, t'is said, and you ought to keep that in mind if your goal is a trophy white-tailed deer.

written by Ed Jenkins/photographed by William Lea

The handful of leaves placed in the two-foot circular scrape the previous evening were undisturbed. "Good—he hasn't been back here yet," I thought before removing a bottle of doe scent and letting a drop or two of the liquid fall into the scrape. Its pungent odor was heavy in the still November morning air.

Turning from the scrape, I began easing through the dark woods toward one of the few trees in the area large enough to hold my deer stand. I passed an almost girdled sourwood tree the buck had raked with his antlers. The rub's size and height on the tree indicated that this was neither a velvet rub nor the handiwork of a small buck. I touched the frayed bark and felt a chill go up my spine knowing that the black-backed beauty that did this was big and that he was in full rut.

As the sun climbed higher and daybreak gave way to midmorning, I resigned this hunt to be as uneventful as the others I had spent on this stand since discovering the buck rubs and scrapes in the area. I began to doubt the wisdom of sitting time after time in this spot seeing only an occasional doe. Still I sat, watched, and waited... and waited. It was around 11 a.m. when I finally gave in to the pains and cramps of sitting almost motionless for five hours and stood up—that's when I saw him.

He was walking fast in that stiff-gaited way only a buck does. His head was held low, straight in front of his body. The polished, bone-white antlers were wall hangers, and fighting the temptation to count the points, I tried to recover from the shock of the "bull of the woods" suddenly appearing before me and to concentrate on making a good shot. He was moving through a maze of honeysuckle thickets and small cottonwood trees and was almost impossible to draw a bead on—when I looked through my rifle scope I couldn't find him; when I looked up from the scope to locate him, I couldn't shoot.

When he finally stopped 60 yards from my stand, he was at one of the scrapes and partially blocked from view by the trees and vines between us. There was a good chance that my 130-grain, .270 bullet would be deflected by a limb or tree, so I decided to wait and to hope for a better opportunity. Through the screen of foliage I watched the buck chew a limb over the scrape, paw the ground alternately with both forefeet, then

White-tailed bucks lose some of their wariness during the rutting season, and for the hunter or photographer, it may be the only chance of seeing a big buck during broad daylight.

HUNTING THE RUT

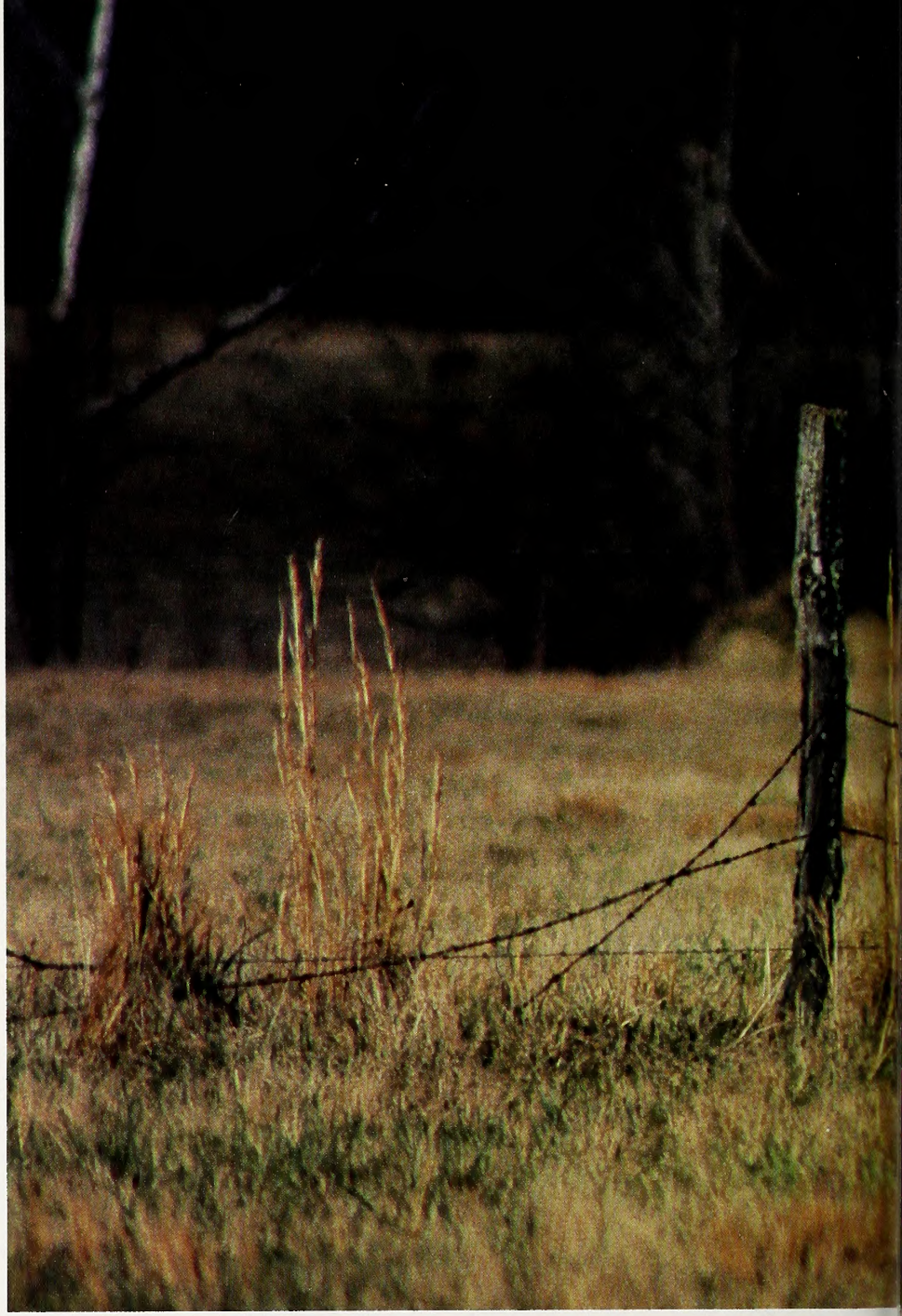
hook his antlers in a small shrub and almost tear it from the ground with quick, side-to-side shakes of his head. Then he was gone, only to reappear moments later facing me as he raked his antlers up and down a small, two-bole tree before him. "Now's my chance," I thought as I hurried a shot that I since have wished time and time again to have had over. I don't know where the bullet went, but I do know where the deer went—straight away at 100 mph!

Although I did not get my buck, I did get a once-in-a-lifetime opportunity to witness firsthand how a buck makes scrapes and rubs and their importance during the breeding season. And as I found out, hunting these areas during the rut can be one of the best ways for connecting with a trophy whitetail.

When deer season opens, most hunters, whether they know it or not, basically will be hunting 1½ year old bucks—spikes, cowhorns, and the small three- to six-pointers. The older bucks, those with one or more hunting seasons behind them, stay in their lairs until dark and are back in them long before the first light of day. These older, wiser, and bigger bucks often pair off and remain out of sight until Mother Nature and "love" take charge of their every movement. Then, bucks that weeks before were content to stay in hiding suddenly start being seen as they move about in search of does. It is as if their sole purpose turns from survival to breeding, and usually it is only during this time that they fall to hunters.

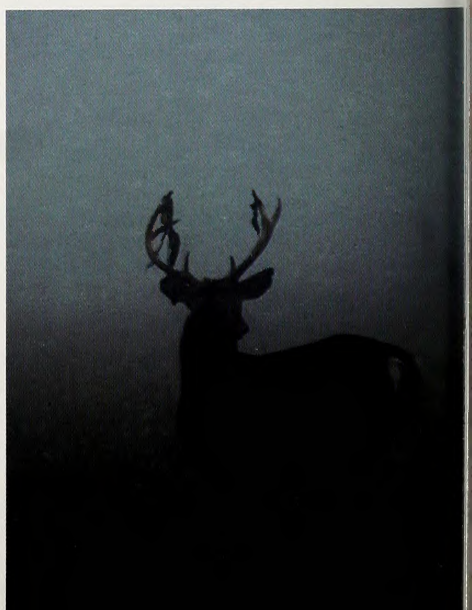
Part of a big buck's undoing depends upon the doe he is with. If she stays in the safety of thick cover during the day, that's where he'll be. But if the buck is honeymooning with a doe and she decides to take a stroll, he'll be right behind her.

This occurred in the fall of 1966 when dozens of students at the University of North Carolina at Chapel Hill witnessed a large eight-point buck chase a doe back and forth through the arboretum on campus. According to a friend of mine who saw the spectacle, the deer paid absolutely no attention to the students, some of whom had to dodge out of the way of the doe and love-struck buck.



The rut is part of the annual life cycle in white-tailed deer. Like other seasonal changes such as antler growth and coat changes, it is triggered by changing lengths of days—a process called photoperiodism. Decreasing periods of daylight stimulate the pituitary gland located in the brain which produces a hormone that causes the testes to increase chemical activity which in turn causes sexual excitement in the buck. This chemical change is responsible for the change of temperament in bucks and is the reason why tame or pet deer can suddenly take on a dangerously aggressive behavior. A number of people have been seriously hurt and others even killed by so-called tame deer that turned on them.

The beginning of the rut is usually associated with the hardening of antlers and the removal of the velvet from them. The velvet is the blood-carrying skin that covers the antlers and nourishes them during their growth. Once the antlers harden, the brown, hair-like skin dries and is sloughed off by the deer rubbing his antlers against saplings,



During the rutting season, mature buck whitetails range more widely seeking mates, and although they may reveal themselves more frequently during daylight hours, it's still uncommon to see one gracefully leaping over a fence. Sometimes deer become entangled in such fences, but this buck has no problem clearing the wire, and photographer Bill Lea clicked his shutter at just the right moment. After bucks lose their velvet in late summer or early fall (left), and the rut begins, they may spend fewer daylight hours bedded down in thick cover (right).

Hunting The Rut

which also causes some tree bark to be noticeably scraped off. In northern climates, bucks may begin rubbing velvet from their antlers in late August while velvet removal in southern climates generally is later and may extend until early October. These early velvet rubs are not as noticeable in the woods as the rubs bucks make prior to the peak rutting time. The later rubs are larger and are thought by some to be sign posts marking dominant areas of the buck. Still others attribute this increased rubbing activity as a way bucks prepare for sparring matches or fights that may occur later with other bucks.

As the peak of the rut approaches, the scrape is another sign deer hunters will begin to see in the woods. The scrape is a pawed area on the ground usually from 1 to 2 feet in diameter that a buck makes in a fairly open and well-traveled deer area. It is usually found at the base of a small tree or under an overhanging limb. An observed sequence a buck follows when making a scrape begins with the deer: (1) rubbing his antlers against the tree, (2) mouthing overhanging limbs, (3) pawing the ground with one or both front feet, and (4) urinating over his hind legs on the tarsal glands and rubbing his hocks together to impart a stronger scent to the area. Scrapes appear to play a role in deer of the opposite sex meeting and communicating with each other. Doe deer in estrus are thought to visit scrapes and sometimes urinate in them or near them thus leaving a trail for the buck to follow when he returns to the area.

The scrape is also believed to function as a signpost of a dominant buck in an area. Whitetail bucks are not territorial to the degree that they will allow other males to remain in the area as long as the subordinate bucks do not invade the so-called intolerance zones of the dominant buck. These intolerance zones are thought to be the area around the scrapes and the area around a doe in heat. This behavior probably results in the larger, stronger male being able to breed with more females and pass on his genes to future generations.

Studies conducted in New York and South Carolina indicate that mature whitetail bucks are able to breed from August until February. Actual breeding does not take place until the onset of estrus in females which generally is thought to be governed by photoperiod. Variations in breeding periods are thought to be due to nutrition, population density, and climatic conditions. While some does in North Carolina, particularly those in the Coastal Plain, go into heat during the end of September and early October, the peak breeding period statewide occurs during November. A study of white-tailed deer in northeastern North Carolina by Scott Osborne, deer project leader for the N.C. Wildlife Resources Commission, shows that 76 percent of the breeding takes place from October 29 through November 18 with the peak breeding period being from November 5-11. Most fawn females that mate in their first year will breed in mid-to-late December although a few may be bred as late as February.

There are a few mature does that will not have fawns every year. Some hunters mistakenly attribute this to either the deer being barren or to there not being enough bucks around to service all the females. But deer researchers have found that poor nutrition and overcrowding of the range are the primary reasons for some deer having one fawn or no fawns. Old age is not a factor in deer reproduction. If adequate food is available throughout the year, adult doe deer will conceive and give birth to twins every year.

The peak of the rut is well over by the first day of winter. As breeding interest wanes, the big bucks return to the deep woods, swamp hideouts, and their elusive behavior. Their purpose fulfilled, the once proudly carried antlers begin to loosen, then fall off. The rut and another cycle in the white-tailed deer's life is over. ⊠

Whitetail Facts And Tips

[1]Rut *(n)* 1: an annually recurrent state of sexual excitement in the male deer; *broadly*: sexual excitement in a mammal esp. when periodic: ESTRUS, HEAT 2: the period during which rut normally occurs. (Webster's Seventh New Collegiate Dictionary)

- During peak rut, a buck's total attention will be on breeding. Many bucks will stop eating and remain constantly on the move resulting in as much as a 25 percent loss in body weight.
- Early velvet-removing rubs in the woods are smaller and harder to locate than rubs made by rutting bucks. When rubs become more visible, the height of the rut is ready to begin.
- Bucks prefer to rub their antlers on smooth bark saplings of 1½ to 3 inches in diameter. Larger deer begin velvet removal before smaller bucks. In general, the larger and higher the rub, the larger the deer making it.
- The increased rubbing activity during the rut will cause the buck's antlers to be polished white and more visible, and the necks of rutting bucks usually become swollen.
- When at a scrape, bucks often will urinate over the tarsal glands on their hind legs and rub their legs together to intensify the scent. This may help them locate receptive does or serve as a warning to other bucks. A buck in full rut has a rank, musky odor.
- Whitetail bucks are not territorial but do appear to establish dominant area boundaries. Doe deer in estrus apparently do not necessarily remain in these boundaries which brings about potential conflicts when a buck follows the doe into a dominant area of another buck. Most serious fights are between larger bucks and occur when one buck is pursuing a doe and a second buck joins the chase.
- When with a doe, a buck may not return to his scrapes for several days. When he returns, it can be at any time of the day since he will be seeking another female as soon as possible. When hunting near a deer scrape, hunters sometimes put leaves in the scrape when they leave. If the leaves are gone when the hunter returns, the buck has revisited the area.
- During the peak of the rut, hunters can increase their odds on a buck by staying in the woods the entire day. Bucks seeking does to breed with will stay on the move, even during midday.
- Doe sex lures may entice a buck into range during the rut. Cotton soaked in sex scent can be carried in 35mm film containers or bottles and can be uncapped when the hunter is on his stand.
- A buck will always travel behind the doe. During the rut if a doe seems nervous and keeps looking behind her, be on the lookout for a buck. The same holds true if a doe is running. Stay alert, the buck may be 20 minutes or more behind her.

Jim Dean

A Legacy For Wildlife

Wildlife Commission Chairman J. Robert Gordon talks about the challenges facing wildlife in the future, and assesses the progress made by the N.C. Wildlife Resources Commission during the past eight years.

An interview with J. Robert Gordon

On a warm afternoon in July, Wildlife In North Carolina *traveled to the Sandhills near Laurinburg to spend a few hours with J. Robert Gordon as he and his 14-year-old son, Stewart, fished a pond tucked away in the scrub oak and longleaf pines. Bob Gordon has been chairman of the N.C. Wildlife Resources Commission since his appointment to the Commission in 1977 by Governor James B. Hunt, Jr. Since Gordon may be leaving the Commission at the expiration of his term in 1985, it seemed fitting to ask him how he assessed the progress made by the 13-member board at the end of his final year as Commission chairman.*

Wildlife In North Carolina (WINC): How did you become interested in wildlife and hunting and fishing?

Gordon: When I was very young growing up in Hamlet, I remember helping my father, the late Stewart Gordon, pack to go on deer hunting trips. Dad had been a member of the North State Game Club in Bladen County since 1939. When I was eight years old, I finally got to go with him. It wasn't so much the hunting that fascinated me as it was being with all those old-timers and hearing the tales. I used to get so excited about going each Thanksgiving that I couldn't sleep. Dad was an avid deer hunter, but he preferred quail hunting, and of course, I fell right into that too. I can hear the excitement in his voice right now when he told his friends I'd killed my first quail. I'd say that quail hunting has become my favorite, although deer hunting is a close second along with freshwater fishing.

But it's not the killing that attracts me. It's the spirit, the tradition, the comradeship of hunting and fishing, and the love of wildlife and a love of the places where wildlife lives.

WINC: You graduated from Hamlet High School and Davidson College, then got a law degree at the University of North Carolina. At what point did you decide to get involved with the state's wildlife program?

Gordon: After completing law school and returning from my tour of duty in Vietnam in 1966, I didn't do anything but hunt and fish for two months. I began to see things in a way I hadn't seen before, and after opening my law practice in Laurinburg, I became increasingly aware of problems of overcrowding on the Sandhills Game Land, as well as other problems facing our wildlife resources.

Jim Hunt had been a classmate of mine at Chapel Hill, and when he ran for governor in 1975, I spoke to him about some of my concerns and he showed a lot of interest. I hadn't even thought about becoming a wildlife commissioner at that point, but in 1977 when the bill to reorganize the Wildlife Commission was presented to the legislature, I went to Raleigh to speak in behalf of it.

Looking back, I think the passage of that bill was the turning point because it added two appointed members of the legislature to the Commission, and this improved the agency's relationship with the legislature and set the stage for several improvements.

WINC: When you were appointed to the Commission and elected its chairman on July 22, 1977, what did you perceive as the major problems?

Gordon: I felt the biggest immediate challenge was to establish a better working rela-

tionship between the Wildlife Commission and the legislature and executive branches of the state, and also establish improved trust and cooperation between the Commission and the sportsmen of the state.

WINC: What steps did the Commission take to alleviate these problems?

Gordon: First, with the help of our appointed members of the General Assembly, we began to try to improve our relationship with the legislature. We tried to improve their understanding of our needs and problems, and elicit their assistance in dealing with the immediate severe financial problem.

The Commission took steps to cut the costs of operation, and some of those cuts, unfortunately, were tough on a lot of people. We cut 17 positions, mostly in the Raleigh office, and this increased the workload for those remaining. We went without badly needed replacement equipment, and cut our vehicle allowances. For awhile, some allowances were as low as $35 a week, including gas, and this was especially hard on the enforcement officers. But as the times got tough, we got tough, and it has paid off in the long run.

WINC: Cuts alone couldn't make up the projected money crunch. What has made the real difference?

Gordon: The cuts showed our good faith in tackling the problem, and Governor Hunt began putting $1 million a year from the general fund into our program to help us get back on our feet. This was the first time the Commission had gotten general fund monies. Without that, I'd hate to think what would have happened.

But also, we began to think innovatively about new ways to raise money without having to ask the sportsmen for frequent license increases. A number of committees were established to seek input and better cooperation and understanding from sportsmen. With the help of these people, the legislature and the Governor, we were able to come up with some ideas that have been highly successful.

WINC: The establishment of a lifetime license came out of this. How did that get started?

Gordon: The lifetime license and lifetime *Wildlife In North Carolina* magazine subscription program was the brainchild of Commissioner Eddie Bridges of Greensboro. He came up with the idea that we could sell these lifetime services and establish a Wildlife Endowment Fund with the proceeds of these sales, using only the interest generated as a source of operating revenue. That program was established, and the fund is expected to top $3 million sometime in November.

As incredible as it sounds, it is now estimated that within 25 to 30 years, this Wildlife Endowment Fund, made up of lifetime licenses, lifetime magazine sales and donations, could be 35 to 40 million dollars. The interest from that amount can provide an awful lot of wildlife management, research and services. Not only that, other states are looking at this program very carefully. North Carolina is the first state to have a lifetime license and endowment fund set up this way. Oklahoma has one, but it's different, and ours seems to be working best. Indeed, many states are considering copying our program, and that's very flattering. For example, Alabama planned its program to be similar to ours.

WINC: Have there been any other pleasant surprises with the lifetime license and Wildlife Endowment Fund program?

Gordon: Yes, one in particular. I've personally been both surprised and pleased at the number of lifetime licenses being sold to older sportsmen. Obviously, a lifetime license is not the bargain for a 60-year old hunter or fisherman that it is for a 30-year-old sportsman. And yet, many older sportsmen have told me they have bought lifetime licenses in one form or another or lifetime subscriptions to this magazine simply because they see it as a way of putting something back into the program — leaving a legacy of wildlife.

My son, Stewart, represents what this is all about. Our generation must do something to ensure a future for wildlife so that our children can enjoy it as we have, and if this Commission isn't remembered for anything else, I hope it's remembered for setting up a way for sportsmen and other wildlife lovers to do that.

WINC: What are the other programs the Wildlife Commission has undertaken to ease the financial problems?

Gordon: Well, of course, most sportsmen are aware of our voluntary North Carolina duck stamp and print program. By voluntarily buying these annual stamps, sportsmen are not only acquiring a collectible stamp or limited edition stamp print but are also putting money directly into programs that will improve the habitat and management of waterfowl in North Carolina.

This year, our duck stamp and print program raised over $600,000 for the state, and this was second only to Texas' 1981 duck stamp program. Our income tax checkoff program has been another big success, and it has the potential to grow even more. We've grossed $218,000 so far in this, our first year from citizens who elect to donate a portion of their tax refund to this program.

WINC: Why is the tax checkoff program so unique compared to other fund-raising programs?

Gordon: That's because at least 75 percent of the funds raised after costs are earmarked specifically for use in management and enhancement of non-game and endangered species — those species for which there are no hunting or fishing seasons. This gives those who are interested in wildlife — but who don't hunt or fish — a chance to make a solid and lasting contribution.

Also, we have maintained all along that the management, habitat protection and research we do for game species also helps non-game and endangered species because they often live in the same places. And the reverse is also true. When we help non-game species, we're also helping game. Over the long run, I'd like to think that this joint effort will bring sportsmen and wildlife enthusiasts together to work for the future of all wildlife.

WINC: Just recently, there's been another

Jim Dean

Teaching a son or daughter to fish is more than just a shared pleasure, it's the best form of insurance for the future of wildlife and its habitat.

major step achieved with the passage of Senate Bill 539 which will return a portion of the N.C. sales tax on sporting equipment to the Wildlife Commission for use in wildlife programs. Is that not also a first for the Commission?

Gordon: As far as we know, North Carolina is the first state to adopt legislation which accomplishes this, and it was Senator Harold Hardison's idea. It has enormous potential, but it would never have been passed without the support of Hardison and Governor Hunt.

I could name so many in the legislature who have also helped us, but to do so would surely leave out some who deserve our appreciation. The same goes for our commissioners. It would be an injustice to single out members since all have contributed so much and given unselfishly of their time to attend our public hearings, committee meetings and regular meetings, as well as worked so closely with sportsmen.

I'd also like to express my appreciation to the Commission's staff for its dedicated effort and support of the board. Despite being understaffed at times, it has been a real team effort for all employees, and I am also proud of the success our field staff has had in maintaining proper and favorable contact with the public.

WINC: One area that may deserve special recognition involves the sportsmen who have played a vital role. What about the various committees?

Gordon: The appointment and use of committees made up of interested sportsmen have been a key to our success, especially the Chairman's Advisory Committee which was set up in 1978 to promote better citizen involvement in our problems and needs. Under the guidance of L. A. Dixon, this committee has helped us gain greater support from the constituency we serve.

Likewise, the Blue Ribbon Committee, made up of sportsmen who have special expertise in business, has helped us with fund-raising ideas. Out of this committee has come the Wildlife Foundation which is set up to receive contributions and promote donations from the estates of deceased sportsmen and others who want to leave a legacy for wildlife.

WINC: Now that the financial picture looks a little brighter, how is this additional income being used, and what plans are there for the future?

Gordon: The endowment fund will be used partly to fund a youth program because we believe that generating youth interest and involvement in wildlife and outdoor sports such as hunting and fishing will be the key to a future for our wildlife resources. Of course, at least 75 percent of the tax checkoff monies must be used for non-game, urban wildlife and endangered species programs. You've already read about that program in this magazine, and there will be more.

The voluntary duck stamp funds will go towards implementing a recently passed long range waterfowl plan for North Carolina, and we think this is vitally needed. From the General Fund and sales tax designation, money will go towards improvements in a wide variety of services, purchase of essential equipment and appropriate salary increases.

WINC: What do you see as the major challenges facing the Wildlife Commission?

"We all have an opportunity to return the favor and put something back into a resource we have enjoyed so much. I owe that to my children. We all do."

Gordon: I think there are two especially critical challenges. The first is to find a way to stem the tide of decreasing wildlife habitat. We must not only maintain and improve the habitat we already have at such places as the Sandhills, but also seek ways to add to this habitat.

For example, the Commission has worked with the Nature Conservancy to acquire the Great Island tract in Bertie County, and we will also be involved with the 120,000 acre Alligator River tract recently donated by Prudential to the U.S. Fish and Wildlife Service. We need also to find ways to acquire land in other parts of the state, and I was especially pleased that we were able to get the Pisgah Fish Hatchery.

We must continue to improve our small game program, and that's an area in which I have a special interest. We now have a small game project leader and a program which we hope will improve habitat and populations of small game and show private landowners how they can best manage their land for this purpose. The private landowner is the key to having good populations of doves, quail, rabbits and squirrels if we can show him how to do it so that it's compatible with his use of his property.

WINC: You've mentioned habitat; what is the other major challenge?

Gordon: It's finding a way to educate our youth in ways to become better stewards of the land, the water and our wildlife resources. Those who love wildlife represent many factions — some unfortunately divided — but we are all in this together. We must not only teach sportsmen better ethics so that they will not abuse their privileges, we must also reach those who do not hunt and fish. By educating our youth through the schools, through this magazine, and by other means, we believe we can ensure a sound future for wildlife through the efforts of all citizens who love wildlife. I am extremely proud of *Wildlife In North Carolina* for its role in this education and for the vast improvements that have been made in the magazine.

WINC: Have there been any other achievements during your tenure that you're especially proud of?

Gordon: Yes, and it's one that hasn't received a whole lot of notice. In 1981, the Commission instituted a warning ticket program so that wildlife enforcement officers had the option to issue a warning ticket under certain circumstances. Prior to that, our officers had no authority to do this. If they encountered a violation, regardless of the circumstances, they were required to issue a citation. Now, where there are cases involving some judgment or question, a warning ticket can be issued, and I think this has helped us improve our image with the public. Of course, this system does not affect our issuance of citations for obviously serious violations such as night deer hunting, killing over the limit or other similar intentional violations. Nor should it, but it has given us a much-needed tool.

WINC: Do you have any final message you'd like to leave?

Gordon: Well, I was thinking about my Dad and how thankful I am that he instilled in me a love of wildlife and hunting and fishing. Some years before he died, he dropped his membership in the North State Game Club, but in 1978 I was given an opportunity to join. I was able to take my father to the club as my guest just as he had done for me so many years before. It was my opportunity to return the favor before he died, and I have always felt very good about that.

I look at our wildlife resources the same way. Through some of the programs we've established, we all have an opportunity to return the favor and put something back into a resource we have all enjoyed so much. I owe that to my children. We all do. ⊠

Autumn unfurls a blanket of color across North Carolina, and the brightest hues are found in the mountains.

The Brightest Season

written and photographed by Harry Ellis

Throughout all of eastern North America, down the long chain of the Appalachians, from the White Mountains of New Hampshire and the Green Mountains of Vermont, through the Alleghanies and the outlying Cumberlands, down the Blue Ridge Mountains of Virginia and North Carolina and the Great Smoky Mountains of North Carolina and Tennessee, autumn is beginning to unfurl a blanket of scarlet and orange and gold across the land.

Just as spring creeps up the mountainsides from below, tinting the bare hills and woods with delicate shades of green, so autumn comes down the hardwood ridges from above and into the valleys with a rainbow of colors.

Situated as we are in one of the world's largest belts of broad-leaf deciduous trees, with a diversity of species not found elsewhere, the beauty of our North Carolina autumns is unsurpassed by any other region on earth. In an annual procession, people from many parts of the country come by the hundreds to

October burns brightly in the hardwood forests, igniting mountain summits first and then slowly engulfing whole valleys in a blaze of russets and golds.

Like a child's toy, the valley farmhouse is dwarfed by Roan Mountain and the sugar maple riots in a crimson burn against the mountain's lofty reach. In this season the scales are lifted from our eyes, and we feast on a banquet of color. Autumn burns to a spectacular climax then lingers in a long afterglow.

the higher mountains of our state for a better view of the color parade, and continue to do so throughout October and into November, until frosts, freezing temperatures and high winds finally extinguish autumn's torch.

As children we were told that Jack Frost, an artist with a palette of many colors, went about painting the leaves with a fine and delicate brush. The story is only a myth. A hard frost actually kills the leaves before they have a chance to turn color. Apparently triggered by diminishing sunlight and shortening days, it is the tree itself that cuts off life from the leaves by forming a layer of corky cells at the base of each leaf stem. Thus the sap channels are closed, producing a change in the internal chemistry of the leaf predestinating its fall, and eventually shearing it from its point of attachment on the twig. As the green coloration begins to fade, yellow, orange and other pigments that had been present all summer, but masked by the intense green of the chlorophyll, are revealed in a riot of breathtaking color.

No phrase can adequately describe it; no words can do it justice — that vast and marvelous spectacle that we know as autumn. But autumn is more than woodlands filled with wine and gold, more than maples clad in raiments of orange and scarlet, more than sumacs decked like savages in war paint, or mountainsides ablaze in multicolored glory. Autumn is more than a season on the calendar.

Autumn is life itself locked up in the seed and the egg. It is wild grapes purpling on the vine and bursting milkweed pods revealing seeds attached to tiny silken parachutes that drift away on the October winds. It is the blue mists of Indian summer shimmering on the hillsides, the shocked corn, and apples ripe on the bough. Autumn is harvest-time, a season of ripeness and maturity, with a round, yellow harvest moon riding in the night sky. It is hay in the barn, pumpkins piled high around farmhouses and bright-eyed children with jack-o'-lanterns. It is dogs stirring restlessly in their sleep dreaming, perhaps, of bronze thickets and thundering wings, a time when man and dog go out together in search of upland game. And autumn is the cricket's cry, telling the story of a season's passing.

The Brightest Season

Sprawled across the farmhouse lawn, the pumpkins symbolize the season's abundance, as do smaller signs of plenty, such as the berries on the cat-briar. This morning's pumpkins, though, are nighttime's jack-o'-lanterns, and what child or adult is not haunted by the sight of their ghoulish faces glowing in the distance on a moonlit night?

The Brightest Season

The pickerel frog hides from October's sun by slipping beneath the painted trillium and the woodfern. He could as easily have been unbrellared by the variegated maple leaf (below) that seems to be unsure which season it is.

The leaves now begin falling from the trees, swirling down in red and gold and carpeting the ground like an Oriental rug. There they will decay and enrich the soil, obeying an ancient cycle from growth to maturity and back to the earth from which they sprang. There is really no end to the forest year, as one season nurtures the next.

Clouds of asters, goldenrods, and thistles now appear along the roadsides and in the meadows, with their attending hordes of butterflies and bumblebees. If you are lucky, you may be able to find a few sky-blue gentians hidden away in some swamp. It is now one of our rarest wildflowers, but can still be found in a few North Carolina marshes. Nature lovers and poets alike have long admired it and sung its praises, as in the famous lines of William Cullen Bryant:

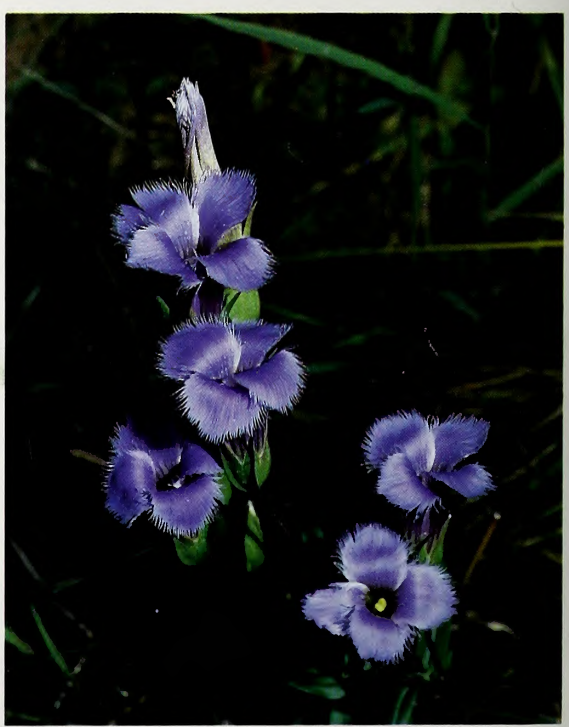
"Thou waitest late and com'st alone
When woods are bare and birds are flown
And frosts and shortening days portend
The aged year is near his end."

Now, as the autumn rains begin, an explosive outburst of mushrooms and other fungi rise over the woods within a few hours time: the deadly amanitas, or destroying angels, the russalas, the puffballs and dozens of others. Everywhere one sets foot, there are more kinds pushing up through the fallen leaves.

Autumn's wild fruits ripen everywhere. The still-green acorns hang on the trees at first, later to fall and provide an abundant food supply for many forms of wildlife. In poor years, when the acorn crop fails, there are mass migrations and sometimes starvation. The spicy fruits of the sumac are relished by white-footed mice and other small rodents. American mountain ash or rowan tree fruits hang on the trees in heavy scarlet clusters and are eaten by many species of birds. In a few bogs in our state, wild cranberries lie like rubies against the green sphagnum moss.

In the night sky of autumn, the stars have a frosty glitter through the thinning treetops. The Big Dipper hangs low over the northern horizon, the constellation of the Swan high above, and off to the east, Orion, the silver-shod hunter, rises into the dark sky.

For all animal life, autumn is a time of change. The fireflies are gone and



The loveliest, some say, and one of the rarest of our fall bloomers is the fringed gentian (above). It is a plant of moist areas, growing on wet slopes and meadows. The mountain stream is pretty with its garland of white asters and pink turtleheads.

The Brightest Season

In Eastern North America no mountain is taller than Mt. Mitchell. From its fir and spruce-topped peak, autumn spreads her glad hand in all directions. Atop Mitchell on such a day, the world seems bright and wondrous and the storm clouds of world events are far away.

the voice of the cicada is stilled but from every thicket and hedgerow rise the resounding songs of the insect musicians — the katydids, crickets and grasshoppers. With the setting sun, the nightly concerts of the great green katydids begin, hour after hour the darkness echoing with the monotonous sound of the males rasping their leaflike wings together to produce the earth's oldest mating calls. Mate to mate, the singing and mating continues well into the night, the fiddlers seemingly driven with a particular frenzy, for the species must be perpetuated before a night of frost and cold comes that will silence them all. Then all the serenading and fluttering of wings will be sealed into those jewel-like eggs that the females have safely hidden away.

The overwintering insects, those relatively few centipedes, millipedes and other arthropods, seek out places of safety underground. Ladybird beetles often cluster in large swarms in search of safe retreats from the coming cold, for many a winter gale will blow before spring's alarm clock awakens egg, cocoon, and hibernating adult.

Snakes crawl away into rock crevices, salamanders to deep underground burrows, and turtles and frogs bury themselves in the mud. Wood frogs often just sink down under the loam of the forest floor and soon are in a state of deep oblivion.

Birds now gather for the migration south. Swallows congregate on telephone wires and chimney swifts circle above chimneys where they have reared their young the past summer. If swallows, swifts and other birds do not, as the ancients believed, plunge beneath the waters and into the mud bottom of some lake or pond to hibernate for the winter, they do something almost equally incredible by flying far, far away, even to other continents. On misty migration nights, the autumn darkness is alive with a million beating wings and the strange and secret voices of the travelers. Although we have banded many thousands of the migrants with numbered leg bands and have charted their courses with precision, solutions to the mysteries of migration still largely elude us.

The woodchuck, after accumulating heavy layers of fat during late summer and early autumn, now goes underground for the long winter sleep, that awe-some half-death of hibernation. As he sinks deeper in a coma-like state, his temperature drops from 97 degrees to just over 40, the pulse rate to a dozen or so beats a minute and breathing slows almost to a standstill, only 10 or 12 times in an hour. His biological fires are banked, like a flame turned low, burning barely enough to keep a spark alive until spring.

The golden days pass only too soon. October comes and goes in melancholy briefness. In the words of Thoreau, "Each season is but an infinitesimal point. It no sooner comes than it is gone. The grass is no sooner grown than it begins to wither."

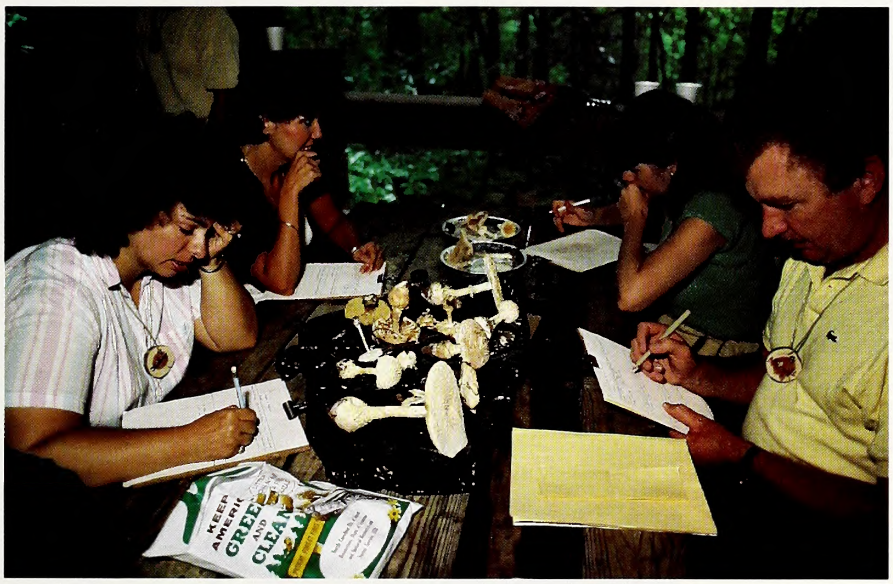
Before we hardly know it, we are well into November. Leaves all fallen now; the trees are bare, stark against the sky. No singing birds, no hum of insects from the fields, no leaping and babbling brooks, just slow-dwindling rivulets choked with fallen leaves. Everywhere, only silence. Not a flower, save one: witch hazel, the last of autumn's gold, bursts into bloom in the naked woods.

In the higher elevations of the North Carolina Blue Ridge Mountains, where I live, the first snow flurries usually begin before November is gone and the first measureable accumulation well before autumn officially ends on December 21.

As the path of the sun swings farther southward and the days grow shorter, the voice of the rising wind is heard, a late November wind that hints of ice and snow to come. It snarls and howls through the bare trees, with wild roaring on the hills and moaning in the chimney corners. Everywhere life is in recession, the pulse of nature beating low. The season's work is complete. Now comes an interval of rest, of life biding its time. What appear to be signs of death and decay are only illusions.

Even now there is promise of rebirth in the tightly packed winter buds, to which next year's green leaves, blossoms and fruits have been entrusted, in live roots under the dead grass stems, and in uncountable billions of seeds waiting in the ground. Life dormant in seed, in egg, in grub, in pupa, and in sleepy mammal, all awaiting the awakening touch of spring as one part of the vast and endless cycle of the seasons, from the sleep of winter through the renewal and growth of spring and summer, and then, once again, to the flaming magnificence of another autumn. ⊠

Because of these workshops, teachers will be better prepared to give students a proper understanding of our natural world and its wildlife resources.



Jane Rohling

Mushroom seekers make notes on their finds during an outdoor workshop activity.

Wildlife Education Goes To School

by Lawrence S. Earley

On a cool July morning near Hendersonville, with fingers of fog still gripping the mountainside, 15 teachers were gathered in a small plantation of young black walnut trees in Holmes State Forest. They were practicing THE METHOD.

The day before, Tom Ennist had said, "This is the day when we see whether they learned the method, because that's what they will have to bring back with them." Ennist was one of the "facilitators" at this weeklong outdoor workshop co-sponsored by the N.C. Wildlife Resources Commission and the N.C. Division of Forest Resources.

"These trees are planted in rows," said one young woman sighting down the black walnut avenue. "And they are approximately the same distance apart."

"Are they?" another objected. The teachers looked and considered. It was true. Some of the trees were closer together. Other observations followed: The trees were obviously being managed. They had been planted in the same year (a sign said 1977), but were not the same size. They had the same leaves and bark but had different trunk sizes, heights and widths.

"What can you deduce about the growth rates of these trees?" a team leader asked.

"That even though they were planted in the same year they grow at different rates."

"Could the environment have had any effect on the growth of these trees?" The group talked it over and agreed that the side of the mountain where the trees were planted would affect the amount of rain and sunshine they received. Whether they were on flat land or hillside would affect growth, too.

And then Marilyn Rinc, a teacher at Rosman Elementary School in Rosman, asked a question. It was really a simple question, but it drew a strange reply. "I wonder what the comparative worth of black walnut to a poplar or oak tree is," she mused.

The group looked at her for several seconds and then one shot back, "How would you find that out?"

Everyone broke up in laughter. It was an in-joke, because for the previous four days the workshop participants had been hearing that very question over and over in answer to their own questions.

"What kind of a tree is that?"

"How would you find that out?"

"Is this a caddis fly larva or a mayfly nymph?"

"Why don't you look at it again."

It was an experience that had many teachers grumbling that the workshop was an exercise in Chinese water torture. But here on the last day, in the middle of an exercise that the teachers themselves had designed for each other, the teachers—

"Somewhere during the course of the workshop or the field trip, there has got to be some emotional involvement. You don't have to hug trees, but the things you do have to mean something."

students this week — were using THE METHOD. The Chinese water torture had worked.

The method . . . that's what these workshops — three of them each summer for the last two years — have been designed to teach. "It is really a methods course, not a tree identification or wildlife identification course," says Rick Estes, coordinator of the workshops and education specialist in the Wildlife Commission's Division of Conservation Education.

"A lot of teachers really hesitate to go out on field trips," Estes says. "Perhaps they are afraid there may be a discipline problem or that they won't know the identifications of trees. We hope that by the end of the week these teachers will realize that they do not have to know all the answers to be able to take their classes out for simple outdoor investigations. If they want to identify things they can get a book."

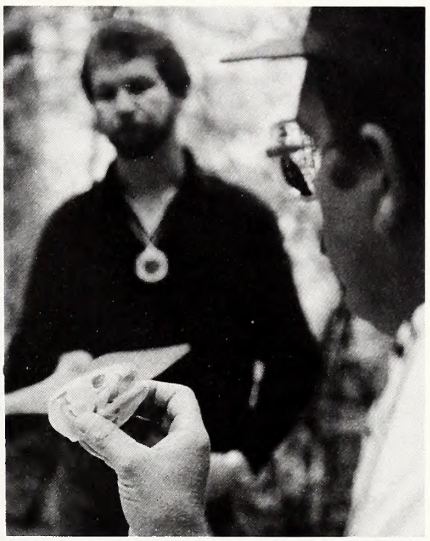
The workshops are designed to boost teachers' and other educators' confidence in their abilities outdoors. And it's the questioning method that helps to foster self-reliance. As participants quickly find out, a question will only be met with another question. The teacher has got to think for himself.

These teacher environmental workshops grew out of materials developed by the U.S. Forest Service and university professors in the late 1960s. "They are based on what is called the 'Process Approach to Learning,' " says Estes. "In these workshops the content is not as important as how you learn it. The workshop leaders are there as 'facilitators,' not instructors. By asking questions in certain sequences they lead groups through a series of field investigations."

The facilitators come primarily from the ranks of the Division of Forest Resources, the U.S. Forest Service and the N.C. Wildlife Resources Commission. But several are graduates of previous workshops and serve as interns before becoming facilitators. "The Wildlife Commission began to get involved in these workshops in 1979," Estes says. "The N.C. Forest Service did not have enough people to do it themselves, so members of the field section of the Conservation Education Division helped out for the next two or three years. This year is the second year since we have taken over the administrative function, but it is still very much a joint venture."

The outdoor workshops are only one of

Jane Rohling



Lawrence S. Earley

A many-legged aquatic creature intrigues these two teachers (facing page). Field activities are an important part of the week-long outdoor workshops. Participants go into the woods to study soils, forests, water and wildlife (above). Participants also travel to a nearby town to study the way the town works. At the State Forest shelter they summarize their findings (left) beneath the workshop slogan.

Outdoor-Education Workshops

The Wildlife Resources Commission is now offering three conservation-education workshops. Each workshop includes free program materials, and two of them are offered free to participants.

Here is a brief description of the three workshops and the materials used in each.

CLASS Project. A three-ring binder of conservation education materials created by the National Wildlife Federation. These materials are arranged in six content areas — energy use, environmental issues, forest/watershed management, hazardous substances, wetlands, and wildlife habitat management. Each content area is independent of the other areas, and the entire package may be used in whole or in part with existing education curricula. The packet contains content area color posters, teacher background materials, and suggestions for class projects. The packet is investigation- and activity-oriented for sixth-grade level.

National certification is available from the National Wildlife Federation for classes completing a minimum number of the activities in the program.

A CLASS Project workshop requires approximately three hours, and will be scheduled on a first-come, first-served basis. There is no charge for the workshop or the materials.

Project WILD. An elementary or a secondary teacher's guide with hundreds of wildlife and ecology activities. The activities are carefully keyed to all subject-matter areas. Project WILD was developed by the Western Region Environmental Education Council and the wildlife agencies in 13 western states. A workshop of Project WILD materials requires six hours.

There is no charge for the workshop or the materials.

Outdoor Education Workshops. Five-day, 30 instructional-hour workshop provided by the Wildlife Commission and the North Carolina Division of Forest Resources. The program features half-day field investigations in soils, water, forests, and wildlife, as well as simulations of land-use planning and urban environments. Three continuing-education units may be awarded.

These workshops are currently offered at the three small state forests near Clayton, Morganton and Brevard during the summer. Additional sites are being considered. There is a $12.00 registration fee. Day students only; camping facilities nearby.

To schedule any of these workshops, contact Rick Estes, North Carolina Wildlife Resources Commission, Division of Conservation Education, 512 N. Salisbury Street, Raleigh, North Carolina 27611, or call (919) 733-7123.

You may also contact your regional conservation education specialist:

Jay Davies, Route 3, Box 409K, Sylva 28779 (704) 293-3398

Lawrence Musselwhite, 5007 Barefoot Dr., Wilmington 28401 (919) 791-3734

Mike Overton, P.O. Box 10, Edenton 27932 (919) 482-7388

Jane Rohling, 102 Kelly Rd., Chapel Hill 27514 (919) 929-8520

Terry Shankle, Route 2, Box 224-B, Denton 27239 (919) 241-2388 or 241-2189

Curtis Wooten, Route 1, Box 824, Morganton 28655 (704) 584-3656

Curtis Wooten

a number of educational activities that the Division of Conservation Education is offering to teachers and others (see box). It is part of the Wildlife Commission's continuing emphasis on educational outreach programs to communicate the important values of wildlife and habitat conservation.

The outdoor workshops are held in three locations across the state in June and July: at Clemmons State Forest near Clayton, Tuttle State Forest near Lenoir, and Holmes State Forest near Hendersonville. The workshop participants are varied. They are mostly teachers, from kindergarten through high school, who earn three continuing-education credits for their participation. Personnel from the Wildlife Commission, Division of Forest Resources, and Soil Conservation Service have also taken part, as have Boy Scout troop leaders and church officials — "anyone who works with education programs," says Estes. "We've had real estate agents take part — just about anyone will find it helpful."

The focus of the workshop activities are the field investigations into water, soil, wildlife and forestry. In the water investigations, for example, participants get their feet wet measuring a creek's water quality, temperature, dissolved oxygen, and rate of flow. They examine its aquatic life, overturning rocks to scoop up what swims away. How many people can that creek support? Participants will figure that one out. They feel the soil. What's the structure, its texture? Take a test tube and chemicals and get the pH of the soil. How could that land best be used?

"We make observations, collect data, and interpret the data and then apply the interpretations to real life situations," says Estes. "Each thing that we do comes back to an application in the classroom or in the community." There are also opportunities during these field investigations to write poetry and descriptions.

An entire day is taken up with a special project. The participants go into a nearby town with an investigation they have designed themselves. They are going to find out how that town operates — its recreation plan, its zoning ordinances, its transportation plans. If you had been in Brevard that Wednesday, you might have seen one of the teachers standing on a corner counting people in cars. They interview, they tape record, they make charts and graphs.

"The whole point of this exercise," says Estes, "is not what they find, but how they find it, how their tools work."

A major block of time is spent in various group activities in one of the shelters. "One of the first things we do — and one of the best — is an activity called 'Six Bits,'" says Estes. "We divide the participants up into groups of six and give each person in that group a little piece of paper that has a part of the solution to a problem. One person has the problem, and the others have the information necessary to its solution.

"It's just really amazing to see what happens. They begin to realize they have to solve this problem before they can go on to the next activity. You begin to see real listening. They start making a chart, they scoot up closer to the table. The noise level goes up.

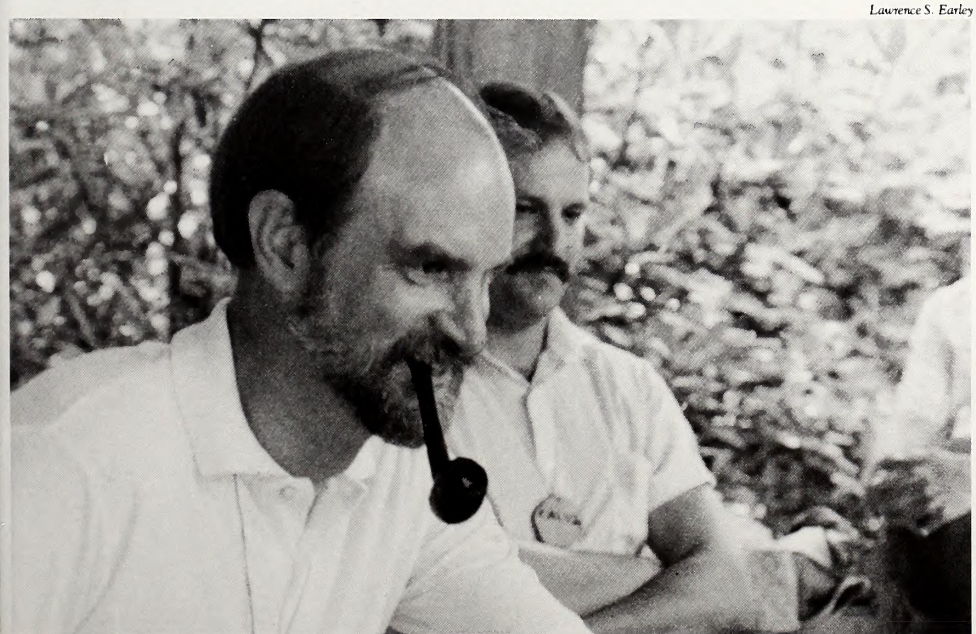
" 'Six Bits' is crucial to the whole idea of

"We hope that by the end of the week these teachers will realize that they do not have to know all the answers to be able to take their classes out for simple outdoor investigations."

Lawrence S. Earley

A philosophy of self-discovery is behind these outdoor workshops, but genial educational coordinator Rick Estes (below) keeps a guiding hand over the week's activities. The result of these workshops is greater self-confidence in the outdoors by teachers.

Lawrence S. Earley



the workshop. The point is that we cannot solve the problem for that group. Every group can solve its problem; every group has all the information it needs. But every member must contribute. The beauty of it for someone who is involved with educating youngsters is that it forces you to recognize the differences in your students, accept those differences, and nurture them."

Rick Estes is excited about the workshops. He sees real appreciation and understanding dawning in the participants about the interrelatedness of all natural resources. He's particularly pleased that all the workshops so far have been filled — 35 teachers at each session. "You figure those teachers teach five classrooms a day with 25 to 30 children in each one — that's a lot of kids we're reaching," he says.

The teachers have also been enthusiastic about these workshops. At Holmes State Forest, Janet Tinsley said, "I've taken a lot of workshops, but this has been one of the most helpful." The third grade teacher at Strauss Elementary School in Brevard noted, "It involves you so much more in what you're learning. You go out and discover for yourself and draw your own conclusions."

Ed Pryor, Athletic Director and physical education teacher at Apex High School, echoed her remarks. "This workshop has been really refreshing. I've learned a lot about the forest here, but I've also learned a lot about learning. We need to bring these methods into the classroom. It puts the fun back into learning."

Which is what Alfred North Whitehead said long ago about successful teaching: "From the very beginning of his education, the child should experience the joy of discovery." It's what Rick Estes wants to happen in all the outdoor workshops that the Wildlife Commission gives.

"My personal feeling," he says, "is that at least when the topic is environmental education, somewhere during the course or the class or the workshop or the field trip there has got to be some kind of emotional involvement. You don't have to hug trees, but the things you do have got to mean something. You can't just shoot facts at people. That's why I like these workshops, because they are involvement oriented. You give people some factual information, but as they see what those facts mean and how they relate to the real world, then these facts come to life." ⊠

Bringing 'Em Back, Alive

by Mark Taylor

Eagles, alligators, sea turtles and other endangered and nongame species of wildlife are being restored in North Carolina thanks partly to your tax checkoff donations and the work of this special team of wildlife biologists.

A teacher introduces young people to the life hidden beneath the surface of a small pond. A biologist walks a beach by moonlight searching for nesting sea turtles. A city planner tries to improve wildlife habitat in an urban park.

What do these activities have in common? All form part of the Wildlife Commission's new Nongame and Endangered Wildlife program, which is largely funded by donations made through a check-off on state-income tax forms. Last year, in the first year of the program, North Carolinians contributed over $218,000 through the check-off. At least 75 percent of this amount, after costs, must be earmarked specifically for nongame or endangered species programs.

This new program is different from traditional wildlife programs which are usually oriented towards a single game species such as deer or bass and the sportsmen who pursue these species. The nongame and endangered species program includes snakes, birds, insects, small mammals and invertebrates—virtually every creature that walks, crawls or swims in North Carolina. And the constituency for this program is anyone who enjoys the sight of a songbird at a feeder or a chipmunk playing hide-and-seek along a rock wall.

As might be expected, a special sort of person is attracted to such a program. The three individuals who form the staff of the nongame and endangered species program have at various times worked in such varied fields as teaching, mapmaking, solar energy, and of course, wildlife biology. Here is a look at the people behind the nongame and endangered wildlife program.

The Nongame and Endangered Wildlife Fund seeks to protect such ornaments of our coastal marshes as this American egret.

Jack Donnelly

Over the past 40 years, Jack Donnelly has probably seen wildlife at its best. As a sportsman he has hunted and fished on both coasts, and as a waterfowl biologist he has been involved in several waterfowl success stories, including restoring populations of Canada geese in the Atlantic Flyway. Though fewer geese winter in North Carolina, their flyway population is at an all-time high. Today, as coordinator of the Nongame and Endangered Wildlife program, he hopes to bring his experience as a sportsman and professional conservationist to bear on the program.

"I had the good fortune to grow up in the town of Bend, Oregon, and have been thoroughly immersed in wildlife since I was a boy," he said. "Bend is located on the Deschutes River in central Oregon where the eastern slopes of the Cascade Mountains meet the high eastern desert. It was a wildlife paradise. When I was a boy I could walk out my back door and fly fish for trout and salmon. In the mountains we hunted elk, black-tail deer, and hiked into remote ponds to fly fish for trout. What I liked best, though, was the waterfowl. The Deschutes River teemed with waterfowl in the 1940s, and I spent every spare moment in my boyhood hunting ducks with my grandfather or watching the birds in the off-season. I've been a birdwatcher all my life."

Donnelly's youthful enthusiasm for waterfowl changed into a lifelong commitment. He earned a B.S. degree in wildlife management from Oregon State University, and then accepted a job as chief of the waterfowl management program for the West Virginia Department of Natural Resources. In this position he established a resident flock of Canada geese, developed a system of statewide waterfowl management areas, established an early wood duck season, and was involved in many other projects. He came to North Carolina in 1967 to become leader of the Wildlife Commission's waterfowl project because "North Carolina is one of the major waterfowl states in the country, and the opportunities were greater."

"One of the biggest advantages of working with waterfowl was having a strong and active constituency in waterfowl hunters," he said. "I'd like to build the same support for nongame wildlife. More than any other group of hunters, waterfowl hunters support their sport through excise taxes, purchase of state and federal duck stamps, and the support of organizations such as Ducks Unlimited. Consequently, wildlife managers have had the funds to develop a system of federal and state wildlife refuges, as well as public hunting areas. This permits comprehensive management of the resource.

"A strong constituency could do the same for the nongame and endangered species," he continued. "Bald eagles and peregrine falcons are flying over the state now because people contributed through the nongame tax

checkoff. If funds become available in the future we could develop observation areas for nongame wildlife, improve habitat in cities throughout the state, develop recovery plans for species that are in trouble — the possibilities are virtually unlimited."

While Donnelly is optimistic about the future of the nongame program, his biggest concern is the effect that loss of habitat has on all wildlife species.

"The time is not far off when we're going to have to look at some areas and say 'these are for wildlife' — no more development," he said. "The frontier ethic of subduing the land is still very strong, and it's an ethic we need to outgrow. There's no 'empty' land left — we've filled this country from coast to coast — and we're going to have to make some difficult choices soon if we're going to have healthy wildlife populations in the future. People put tremendous stress on wildlife, and those species that don't tolerate human disturbances are hurting.

"The black bear population in the pocosins of eastern North Carolina offer an example. As these wetlands are cleared, bear populations disappear — there's no place left for the bears to go. There's no telling how this clearing has affected nongame species that live in pocosins. We're fortunate to have a fair amount of public land in North Carolina, but private farm and forest land is fast being lost to development. We think of ourselves as a rural state, but we rank 10th in population nationally. Unless we save prime habitat now, in the future many North Carolinians may only experience wildlife in backyards or urban parks.

"I thought of this recently when I attended a waterfowl meeting in New York," he recalled. "We drove out to Jones Beach on Long Island and stopped in a huge parking lot. On a summer day that lot is full by 10 in the morning, and there's 40,000 people on the beach. There's no room for wildlife at Jones Beach anymore, and precious little for people. The only outdoor experience that many of those people know is to sit outside on a little patch of crowded beach. I think that's sad — it's such a contrast to how I grew up."

Bryant Tarr

The craggy slopes of Grandfather Mountain made the task of releasing peregrine falcons a formidable undertaking. Four young were released at the site in the first reintroduction of this s endangered species to the southern Appalachians.

John Alderman

"If you were going to build a house on this site, what could this dead tree tell you about how it should be built?"

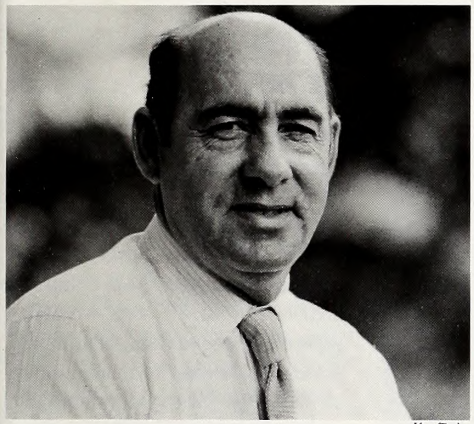
A group of teachers surrounded the skeletal remains of a dying cedar in Clemmons State Forest near Raleigh. John Alderman, education coordinator for the nongame and endangered wildlife program, stood off to one side as they took notes.

"If you take a close look at the tree, you'll see moss growing thickly on one side," he said. "That's the north side, where there's the least amount of light. Using this information, you could orient your house from east to west to take full advantage of the path of the sun. You'll also note that the slope here faces south so it's a good location for a solar home. Finally, most of the other trees around us are pines — indicating that the soil is sandy and well drained."

Alderman was helping to conduct a teacher workshop in environmental education, bringing a "holistic approach" to the subject that reflects a background peppered with an intriguing variety of experiences and occupations. He was born near Beckley, West Virginia, but grew up in Fayetteville and holds degrees in wetland ecology and science education from the University of North Carolina in Chapel Hill. In addition to working for the Wildlife Commission, he is also working on a Ph.D. in environmental education at the University of North Carolina. Along the way he has also worked as a teacher, construction worker, invertebrate taxonomist, solar technician, water chemist, and installer of woodstoves.

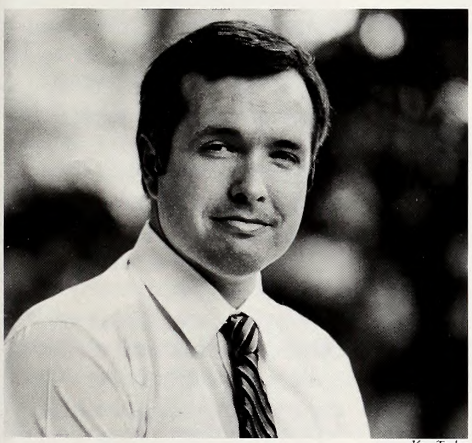
"Nature can teach us a lot about everyday life — such as how to best site a house — and I'd like to introduce this concept to environmental education," he said. "Currently, we're introducing an environmental-education package called Project WILD into elementary and secondary schools throughout the state. This program was developed by the Western Region Environmental Education Council and the Western Association of Fish and Wildlife Agencies, and deals with conservation of watersheds, forests and wildlife. This is just a start, however. Eventually, we plan to develop an environmental education program specific to North Carolina that would begin in kindergarten

"People put tremendous stress on wildlife, and those species that don't tolerate human disturbances are hurting."



Ken Taylor

Jack Donnelly — *"The time is not far off when we're going to look at some areas and say 'no more development — these are for wildlife.'"*



Ken Taylor

John Alderman — *"Nature can tell us a lot about how to live if we'll only listen."*

Ken Taylor

Melinda Welton — *"Much of the nesting habitat for terns, herons, egrets and pelicans has been lost to oceanfront development."*

and run through grade 12."

Ironically, one of the experiences that had a profound influence on Alderman's personal and professional life arose from his search for cheap rent.

"I didn't have much money when I started school, and needed a cheap place to live for myself, my wife, and our young family," he said. "Fortunately, I found a three-room house on a six-acre pond in the woods near Pittsboro for $35 a month — it had a wood stove, one electric outlet, a kitchen sink, and an outhouse. We lived there for four-and-a-half years — until I recently finished building a solar home near the Haw River.

"There were many mornings when we saw wild turkeys walk through our front yard, and in the fall the pond was often filled with hundreds of ducks," he said. "We lived very close to the land. We had a large garden, caught fish from the pond, and stepped out the door and went hunting for quail, squirrels and rabbits. There were many nights when it wasn't much above freezing in the house, and we went days without seeing other people. When we moved there, I was just trying to save a few dollars. Looking back, I wouldn't trade that experience for anything."

Melinda Welton

The path that leads to a life's vocation is not always straight. Melinda Welton, leader of the Wildlife Commission's endangered species project, was drawing maps when she discovered wildlife biology.

"I've been fascinated by nature since I was a kid, and spent a lot of time when I was young wandering around a big chunk of woods near my family's home in Stamford, Connecticut," she said. "Someone gave me some field guides when I was in high school, and they were a big help. In college, I studied geography and took a lot of courses in botany, zoology, and earth sciences — mostly to satisfy my curiosity about the natural world. After I graduated, I took a job as a mapmaker for the town of Putnam, Connecticut. I was indoors all the time, and the six months I spent there seemed like an eternity."

While she was drawing maps, Welton became a volunteer at the Great Gull Island Tern Research Station which is run by the American Museum of Natural History. "We were studying the breeding biology of common and roseate terns, and I helped conduct egg counts and trapped and banded terns. After one trip, someone gave me a book on the biology of bird populations. That caused something to click — everything I had dabbled in fell into place. I knew then that I wanted to work in ornithology, and couldn't get back to graduate school fast enough."

Welton went to the University of Connecticut where she studied factors influencing song sparrow populations for her graduate degree in ornithology. Then, she worked at an Audubon Society refuge on the Florida Keys studying reddish egrets, great egrets and wood storks. Following this, she worked for the Florida Game and Fresh Water Fish Commission's endangered species program — mostly on studies of bald eagle nesting. Her last position was with the endangered species program in New Jersey where she dealt with public relations, surveys of shorebirds, restoration of bald eagles, and restoration of cliff swallows using artificial nests.

Since coming here Welton has been involved in restoration and management programs for endangered sea turtles, bald eagles and peregrine falcons. In the future, however, she will be involved in two new projects.

"In the near future we plan to host a symposium on the status of all wildlife species in the state in cooperation with the N.C. Museum of Natural History," she said. "Restoration of endangered species is fine, but it is far better to identify species that are in trouble and take steps to correct the situation before they become endangered.

"We also plan to work with colonial-nesting shorebirds — which include pelicans, skimmers, terns, herons and egrets. These birds are listed as being of special concern, and traditionally nest on coastal beaches and islands. Much of this nesting habitat has been lost outright to coastal development, or has been degraded by related problems — such as human disturbances or predation by household pets and raccoons which thrive near people — to the point where the birds will no longer nest. Except for nesting areas that are protected by public lands or conservation organizations such as the Audubon Society and The Nature Conservancy, most nesting sites for these birds are now found south of Ocracoke on man-made spoil islands created by dredging. These artificial nesting sites need to be identified and protected. Plans are underway to develop even some of these sites if we don't act quickly to save them." ⊠

On Inland Reservoirs

Illegal Netting Hurts Striper Populations

Written and Edited by Mark Taylor

The work could only be done under the cover of darkness. The two men in the small boat on Roanoke Rapids Lake last April were planning to make some quick money by illegally netting some inland striped bass or "rock." However, they were in for a surprise.

"They never even saw us until it was too late," recalled Lieutenant Sam Wright of Roanoke Rapids. Wright is a safety officer with the Division of Enforcement of the N.C. Wildlife Resources Commission, and has worked on striped bass commercialization cases in the area for many years. "We had spotted them running without lights by moonlight, and we overtook them. It was about 4:30 a.m. and they didn't notice us until we pulled alongside. One of the men threw the gill net over the side, but my partner Sergeant Mike Fulkerson caught it."

Wright and Fulkerson seized the net as evidence. It was a brand-new 100-yard weighted gill net made for commercial fishing on the coast. The 4-inch mesh was designed to snare large fish — such as bluefish or striped bass — and the lead line and lack of floats showed that it was designed to be set on the bottom — far out of sight.

"Sinking gill nets are commonly used in commercial fishing operations, and are also widely used by poachers who net striped bass on the Roanoke River and Roanoke Rapids, Gaston and Kerr lakes," said Wright. "The men set these nets, then return later to haul them — they've marked the locations in their minds very well. All of this is done at night, and is very difficult to detect. The fish are later sold to dealers."

The men who were arrested by Wright and Fulkerson were later taken to court. The boat owner paid $285 in fines and court costs, and the owner of the net paid $135 in fines and court costs. In addition, the net — which was brand new and was being used by the men for the first time — was confiscated and turned over to the Wildlife Commission.

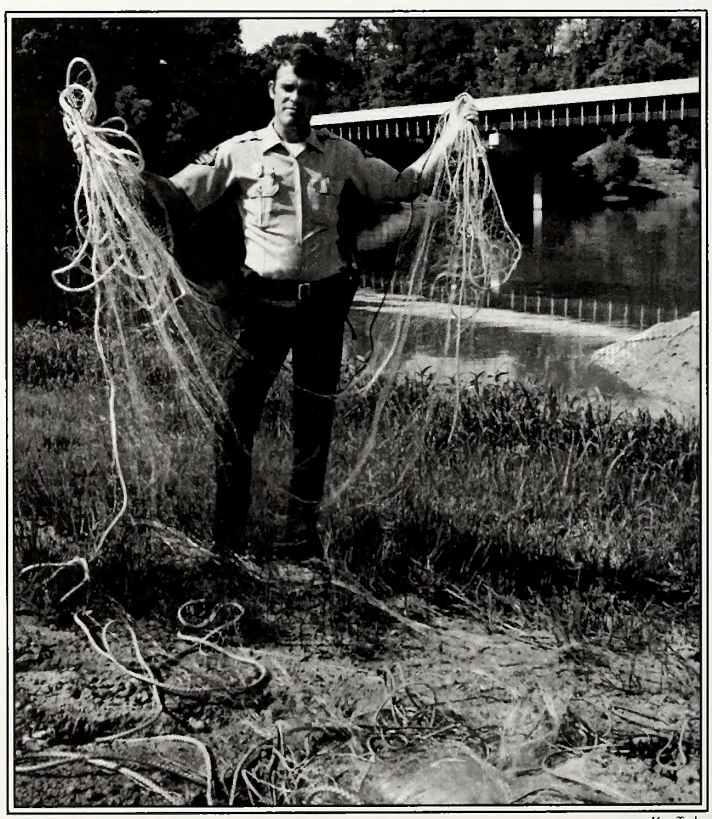
This case of illegal netting of striped bass is not an isolated incident. Indeed, it is a widespread problem.

"We hear a lot of reports of illegal netting of striped bass in these lakes and the Roanoke River," said Cindy Williams of Nashville, a biologist with the Wildlife Commission's Division of Inland Fisheries. "The illegal netting of fish on the Roanoke River hurts the natural striped bass population in Albemarle Sound — which in recent years has suffered badly from a population decline linked to pollution. The situation is different in the inland reservoirs. The striped bass in these waters have been raised in hatcheries and released for recreational fishermen, and anglers are being cheated out of their license dollars when these fish are illegally netted."

The striped bass that are illegally netted in these waters are being sold. "Often, we hear reports of these fish being sold to seafood dealers in Norfolk or along the North Carolina coast — and of course, some local dealers may be involved," said Williams. "One problem is that there is no way to tell the difference between a striped bass that is caught by a commercial fisherman legally in salt water and a fish taken from an inland lake. Considerable money can change hands in this poaching. Since there is a ready market for these fish — striped bass routinely sell for $3-$4 per pound in seafood markets in the Northeast — the business in legal and illegal fish is brisk."

Wright echoes these sentiments, and adds that public cooperation is the key to controlling this illegal activity. "The people who are netting stripers in our lakes either live on the lake or have the boats docked there because we watch for this activity at boat ramps," he said. "The fish are also often sold locally. We need public cooperation to crack these cases. Sportsmen whose license dollars are used to raise stripers in hatcheries are being cheated."

Illegal netting of stripers peaks in the spring and summer, although the activity takes place year-round. Those having information about netting of stripers — or other wildlife violations — may report it to the Wildlife Commission's toll-free, 24-hour Wildlife Watch Hotline at 1-800-662-7137. All calls will be kept strictly confidential.



Ken Taylor

Quite A Haul: *This brand-new 100-yard gill net was confiscated by Lieutenant Sam Wright and Sergeant Fred Fulkerson (shown) from two men who were illegally netting striped bass on Roanoke Rapids Lake. Illegal netting of stripers is a serious problem on several Piedmont reservoirs and the Roanoke River.*

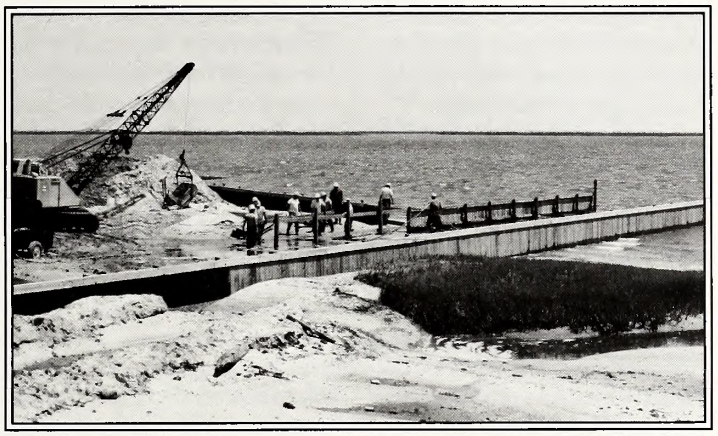
Sales Tax Returned To Commission

New Legislation Provides Boost For Wildlife

Wildlife will be the winner in the future when you buy a package of fish hooks, a box of shotgun shells, or any other item of hunting and fishing equipment at your local sporting goods store. Recently, the North Carolina General Assembly adopted legislation that will return a portion of existing state sales tax receipts from the sale of hunting and fishing equipment to the N.C. Wildlife Resources Commission for wildlife programs. The legislation was sponsored by Senator Harold W. Hardison of Deep Run, and had the strong support of Governor James B. Hunt Jr.

The first transfer of funds—totaling $500,000—takes place this year. The funds are earmarked for improvements in wildlife enforcement programs. In fiscal year 1985-86 the Wildlife Commission will receive $2 million in sales tax funds which will be used for various wildlife programs. In subsequent years the annual appropriation will be based on the $2 million figure and adjusted up or down depending on total tax receipts. At least 50 percent of these funds must be used for nonrecurring costs—such as large equipment items, renovation of existing facilities, and other projects.

"This legislation is a great step for wildlife conservation," said Vernon Bevill, executive director of the N.C. Wildlife Resources Commission. "As far as we know we are the first wildlife agency in the nation to receive funding based more closely to the business that wildlife generates. As we enter our budget-planning process for the next two years, these funds will give us a much clearer picture of what we have to work with and will allow for better opportunities to implement wildlife programs on the ground. We plan to make significant improvements in our enforcement, boating access, and inland fisheries programs in the near future. Of course, other areas of need will not be neglected."



Rex Gary Schmidt

More In Sight: *Improved boating access will be one of the benefits from recent legislation that returns a portion of state sales tax revenues to the Wildlife Commission. Improvements will also be made in enforcement, inland fisheries programs and other areas of need.*

"I think it's important that we recognize our General Assembly for their willingness to support a progressive wildlife management program in North Carolina," added J. Robert Gordon of Laurinburg, chairman of the N.C. Wildlife Resources Commission. "We must have their help to maintain a quality wildlife program, and we appreciate how they have worked with us to improve outdoor opportunities for the millions of sportsmen and other citizens who enjoy our wildlife. We all benefit from these programs. For every dollar spent on wildlife programs in North Carolina, almost $50 is returned to the economy of the state by those pursuing related outdoor interests." A 1980 survey showed that wildlife-related activities are worth at least three-quarters of a billion dollars to the North Carolina economy.

Gordon said, "The Wildlife Resources Commission and all of the sportsmen of North Carolina owe a great deal of gratitude to Senator Hardison for having conceived of this bill and worked for its passage, and also to Governor Hunt who took a strong personal interest in this legislation and actively lobbied for it in both houses of the General Assembly. The Wildlife Commission has enjoyed Governor Hunt's support in many ways, and we are most appreciative.

"I consider the passage of this bill and the creation of the North Carolina Wildlife Endowment Fund to be the crowning achievements of this administration in wildlife conservation. We also owe a debt of thanks to the members of the General Assembly who worked with Governor Hunt and Senator Hardison to help make this bill a reality."

Nongame And Endangered Species Featured

Wildlife At The State Fair

If you plan to visit the North Carolina State Fair, be sure to drop by the Wildlife Commission exhibit near the Village of Yesteryear. The fair will run from October 12-20, and the theme for this year's exhibit is North Carolina's Nongame and Endangered Species program.

"We plan to have an excellent exhibit focusing on activities being carried out under the North Carolina Nongame and Endangered Wildlife Fund which is supported largely by the Nongame Wildlife Tax Checkoff," said Sid Baynes, chief of the Division of Conservation Education of the Wildlife Commission. "The exhibit will include displays of backyard wildlife habitat, live nongame fsh, endangered species projects and others.

Wildlife Commission personnel will also be renewing and selling subscriptions to *Wildlife In North Carolina* magazine, and will be taking orders for the 1985 North Carolina Wildlife Calendar. In addition, information will be available on improving wildlife habitat in backyards, lifetime hunting and fishing licenses, nongame and endangered species programs, and other subjects.

NONGAME & ENDANGERED WILDLIFE FUND

Don't Hunt Without It!

Blaze-Orange Saves Lives

Are you ready to go deer hunting when the seasons open? Have you scouted out a new area, erected a deer stand, sighted in your rifle—and broken out your blaze-orange hunting jacket?

That's right—if you don't wear blaze-orange clothing, you're not prepared for a safe hunting trip. While some hunters claim that blaze-orange spooks deer, there is no solid evidence to substantiate this claim. There is overwhelming proof that it saves lives. Consider these statistics from states where blaze-orange is required for hunters.

- Minnesota had had no "mistaken for game" accidents where the victim was wearing blaze orange.

- Connecticut reports that since passing a mandatory blaze-orange law almost all hunting accidents are now self-inflicted.

- Wyoming has had no "mistaken for game" accidents since 1973 when the use of blaze-orange was made mandatory for big-game hunters.

"Although blaze-orange is not required for hunters in North Carolina, we certainly urge all hunters to wear it," said Colonel Winfield Rhyne, chief of the Division of Enforcement of the N.C. Wildlife Resources Commission. "This is especially important for deer hunters. However, we also urge sportsmen hunting small game—especially quail, rabbits and grouse—to wear blaze-orange. These animals are often hunted in thick cover, and blaze-orange is a great help in keeping track of your hunting party. Finally, we urge every hunter to be absolutely sure of his target before shooting. Once you fire a bullet you can never bring it back, and a hunting accident is a tragedy that will haunt you for the rest of your life."

Ken Taylor

A Welcome Gift: *The Broken Anchor Fishing Club recently presented the Wildlife Commission with a citizens band radio and antenna, which is being used for enforcement activities on Kerr and Gaston lakes. Here, Holt Thornton (right), presents the radio to Vernon Bevill, executive director of the Wildlife Commission, and Colonel Winfield Rhyne, chief of the Commission's Division of Enforcement.*

Through CLASS Project

Teacher Brings Wildlife Indoors

A Bryson City teacher was recently recognized by the National Wildlife Federation for being the first teacher in North Carolina to complete a CLASS project—a comprehensive environmental education program developed by the Federation for junior-high and middle-school curricula.

Sarah Heisel, a teacher at the Almond Elementary School in Bryson City, and her class completed three investigations in the CLASS project and performed a community conservation project to earn the award. The CLASS project is divided into six major areas—energy use, environmental issues, forest and watershed management, hazardous substances, wetlands, and wildlife habitat management. The materials are designed not only to introduce students to the natural world, but also to enhance existing curricula and develop students' math, science, social studies and language skills. In addition, students also develop research techniques, learn about participatory democracy, and clarify their own values on society and natural resources. Strong emphasis is placed on helping the students to learn how to think, and not what to think.

After attending a workshop on the CLASS project, Heisel introduced the materials to her students. "Wildlife is an important topic to these kids, so I was not surprised when they chose to study this subject," she said. "After introducing the materials to my students, I found that I could step out of my role as an instructor and become a part of the class during the investigations. The students were really interested in the material, and needed little prompting to learn about wildlife."

As a first step, the class decided to invite speakers to talk to them about wildlife. "We found that a tremendous amount of information on wildlife management was available from people right in this area," said Heisel. "For example, David Gordon—a wildlife enforcement officer stationed in Bryson City—gave the class a particularly interesting presentation on the effects of illegal hunting and fishing, and told the students how they could help protect wildlife from poaching. Employees of the National Park Service also talked to us."

Armed with this knowledge, the students explored wildlife in their community. Some developed projects which improved songbird habitat near their homes. After visiting a local trout hatchery, others investigated the threatening effects of acid rain on trout, soils and forests in western North Carolina. And all of the students developed a better understanding of wildlife, the need to abide by hunting and fishing regulations, and the importance of our natural resources and environment.

"I learned as much as the students did, and plan to use the CLASS project in the future," concluded Heisel. "Personally, next year I'd like to work on the energy-use investigation but I'll let the students make the choice. These materials are really great, and I highly recommend them to other teachers."

More information on the CLASS project is available from the N.C. Wildlife Resources Commission, Divison of Conservation Education, 512 N. Salisbury St., Raleigh, N.C. 27611.

—Jay Davies

Underwater World

Schooling Fish Photographers Share Tips

The article "Why Fish School" in our August issue had one inadvertent omission — the names of the two photographers. William Roston photographed the bass defending its nest, as well as the cover, and Harold Quidley snapped the schooling fishes on pages 6 and 7.

William Roston is one of a handful of underwater photographers specializing in freshwater subjects. A native of Forsyth, Missouri, Bill takes his pictures in the lakes and streams of the Missouri Ozarks using a mask and snorkle. He feeds the fish early in the spring to get them used to his presence after which he can approach quite closely without spooking them.

"I use the Nikonos IV A camera," he says "with two small SR 2000 flash units and ultra wide-angle lenses — a 15 mm and and 18 mm." The action is too fast and the water too murky for Roston to be able to follow his subjects through the viewfinder and focus. "At f22 I'm focused from 6 inches to infinity, so I just point the camera and shoot," he says.

His techniques have enabled him to place photographs in such publications as *Audubon, Natural History, Outdoor Life* and *Sports Afield*. He was the 1981-82 photo contest winner in *Nikon World*. His photos were also featured in the August 1983 issue of *Wildlife In North Carolina*.

The photos of Raleigh photographer Harold Quidley have also been seen in these pages, most recently in the June issue ("Sea Gypsy," p. 22). Photographing with his wife Donna for the past eight years, Harold has pursued his "obsession," as he calls it, off the North Carolina coast as well as in the Caribbean on commercial assignments.

The Quidleys have sold photos to several magazines, including *Skin Diver, Atlantic Coastal Magazine* and *Carolina Lifestyle*. Their pictures were winners at North Carolina's Seas '82 underwater photo contest.

— *Lawrence S. Earley*

For Squirrel, Grouse, Coon

Hunting Seasons For Small Game Open

Small-game hunters rejoice — your time of year is at hand. Hunting seasons for several species open this month.

The squirrel season opens on Monday, October 15, and runs through January 31. The bag limit is 8 squirrels daily with 16 in possession and a season limit of 75. In areas where fox squirrels may be hunted the bag limit may include 1 fox squirrel daily with 2 in possession and a season limit of 10.

The grouse season also opens on Monday, October 15, and runs through February 28. The bag limit is 3 birds daily with 6 in possession and a season limit of 30.

Raccoon seasons also open this month. The western season (in and west of Stokes, Forsyth, Davie, Iredell, Mecklenburg and Union counties) opens at sunrise on Monday, October 15, and runs through January 31. The eastern season (in and east of Rockingham, Guilford, Davidson, Rowan, Cabarrus, Stanly and Anson counties) opens at sunrise on Monday, October 22, and runs through February 28. The bag limit for raccoons in and west of Stokes, Forsyth, Davidson, Stanly and Union counties is 1 per day with 2 in possession and a season limit of 20. Elsewhere, the bag limit is 3 daily with 6 in possession and a season limit of 30.

Other regulations dealing with raccoon hunting may be found in the *1984-85 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest*. This publication is available from license agents or by contacting the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Joel Arrington

Head For The Hills: *Grouse season opens this month on Monday, October 15, and there's no better excuse to take a hike in the mountains. The bag limit for grouse is three birds per day — and you'll earn every one of them.*

Calendar Of Events

October 3-6
Surf Fishing Tournament at Nags Head. For more information contact Mrs. Claire Bullington, P.O. Box 626, Kill Devil Hills, N.C. 27948.

October 4-6
U.S. Open King Mackerel Tournament at Southport. For more information contact Annette Baxter, Rt. 5, Box 52, Southport, N.C. 28461.

October 13
Salt Water Sport Fishing Expo at the Marine Resources Center in Atlantic Beach. For more information contact the N.C. Marine Resources Center, Atlantic Beach, N.C. 28512.

October 13
Lumberjack Day in Burnsville. Log rolling, pole felling, and other events. For more information contact the Yancey County Chamber of Commerce, 2 Town Square, Room 3, Burnsville, N.C. 28714.

October 18-21
Annie Oakley Trap Shoot at the Pinehurst Gun Club in Pinehurst. For more information contact the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

October 20-21
North American Indian Festival and Fall Pow Wow at the Schiele Museum of Natural History in Gastonia. Features dance competitions, storytelling, crafts, films and exhibits. For more information contact the Schiele Museum of Natural History, P.O. Box 953, Gastonia, N.C. 28053.

The *NEW* North Carolina Wildlife Calendar

We're wild about our new calendar and we know you will be too!

All the outdoors information you have come to expect plus beautiful wildlife art prints each month.

The 1985 calendars will be arriving soon. Order today and be among the first to receive one.

And remember, the North Carolina Wildlife Calendar now makes the perfect gift for all the outdoors enthusiasts in your life.

Please send me ____ N.C. Wildlife Calendars at $6.00 each $_____

Wake County residents add $.27 sales tax per calendar _____

Other N.C. residents add $.18 sales tax per calendar _____

Enclosed is my check for ..... Total $_____

Name _____

Address _____

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Phone (____) _____

Send order to: CALENDAR: N.C. Wildlife Resources Commission; 512 N. Salisbury Street; Raleigh, N.C. 27611

All orders must be prepaid. We do not bill. A $10.00 charge will be made on returned checks. (N.C. G.S. 25-3-512).

ORDER TODAY

Six Awards Won

Education Programs Honored

Several education programs of the N.C. Wildlife Resources Commission recently won awards in an annual competition sponsored by the Association for Conservation Information. This professional organization is composed of communicators within natural resources agencies throughout the United States and Canada.

Wildlife In North Carolina placed third in the competition for best magazine. Finishing first was *South Carolina Wildlife* and second was *Nebraskaland*.

North Carolina tied for first place for best magazine article with *Montana Outdoors*, which is published by the Montana Department of Fish, Wildlife and Parks. The winning entry from North Carolina was a profile of Annie Oakley during her years at Pinehurst entitled "The Lady Could Shoot." This article was written by Assistant Editor Mark Taylor, and published in the February 1983 issue of *Wildlife In North Carolina*.

North Carolina also finished second for the best black and white photography. The winning entry was a black-and-white photo essay entitled "The Winter Coast," which was published in the December 1983 issue of *Wildlife In North Carolina* magazine. The text of the article was written by Associate Editor Lawrence S. Earley, and photographs were taken by Earley and Curtis Wooten, contributor and western field representative for the Division of Conservation Education.

In the special publications competition, North Carolina finished first. The winning entry was the 1983-84 North Carolina Wildlife Calendar. For best news program, the Wildlife Commission placed third. Submitted was the North Carolina Wildlife Newsletter, a bi-monthly press package that is sent to all newspapers, radio and television stations, and outdoor writers in the state.

The promotions campaign for the North Carolina Nongame and Endangered Wildlife Fund also won second place in the "Special Efforts" category. Displays, magazine articles, radio and television spots, and other media efforts were part of the campaign to promote the nongame tax checkoff.

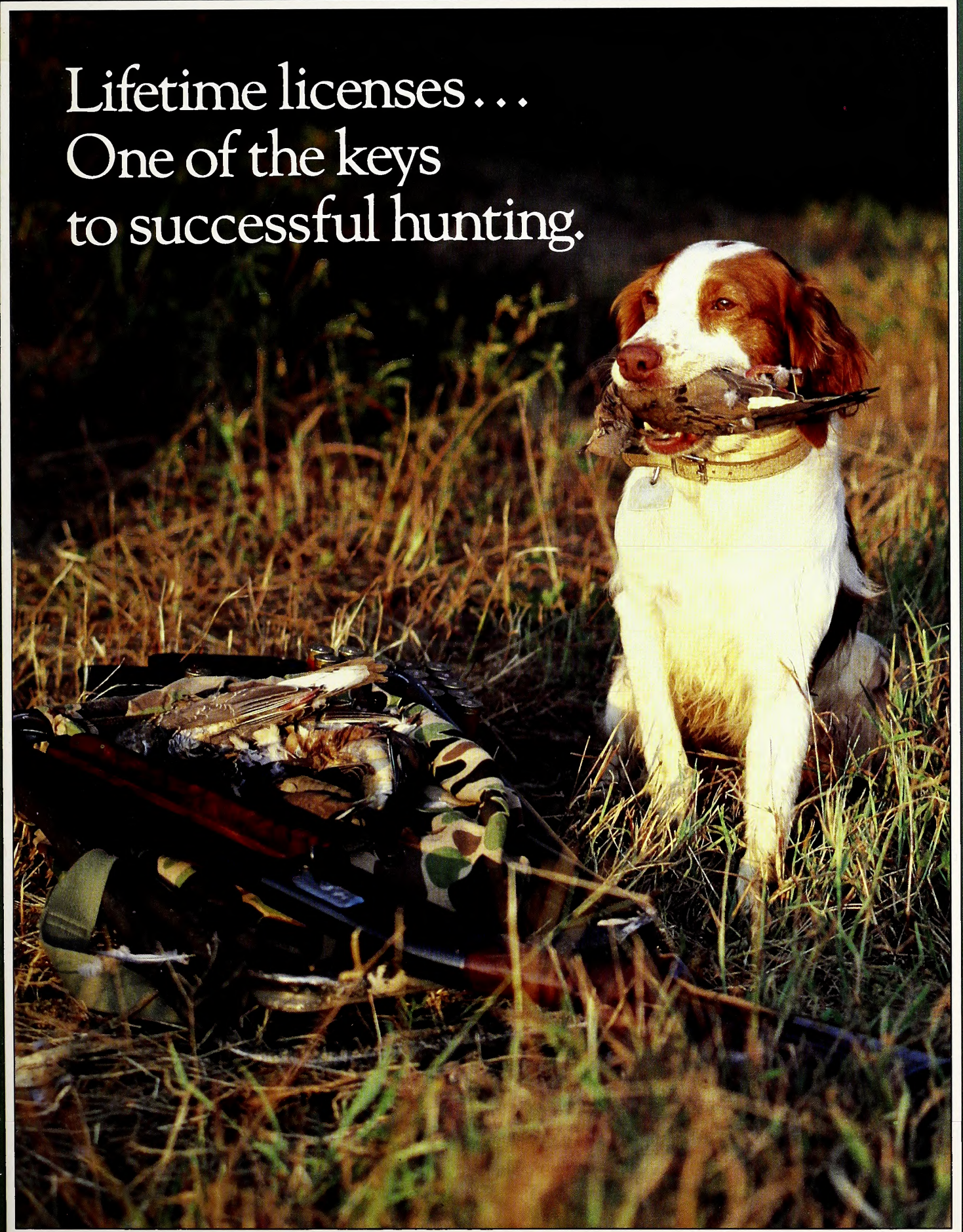
"We are very honored to have won these ACI awards," said Sid Baynes, chief of the Commission's Division of Conservation Education. "We are deeply committed to keeping the public informed on wildlife and natural resource issues in North Carolina, and we feel that these awards reflect that commitment."

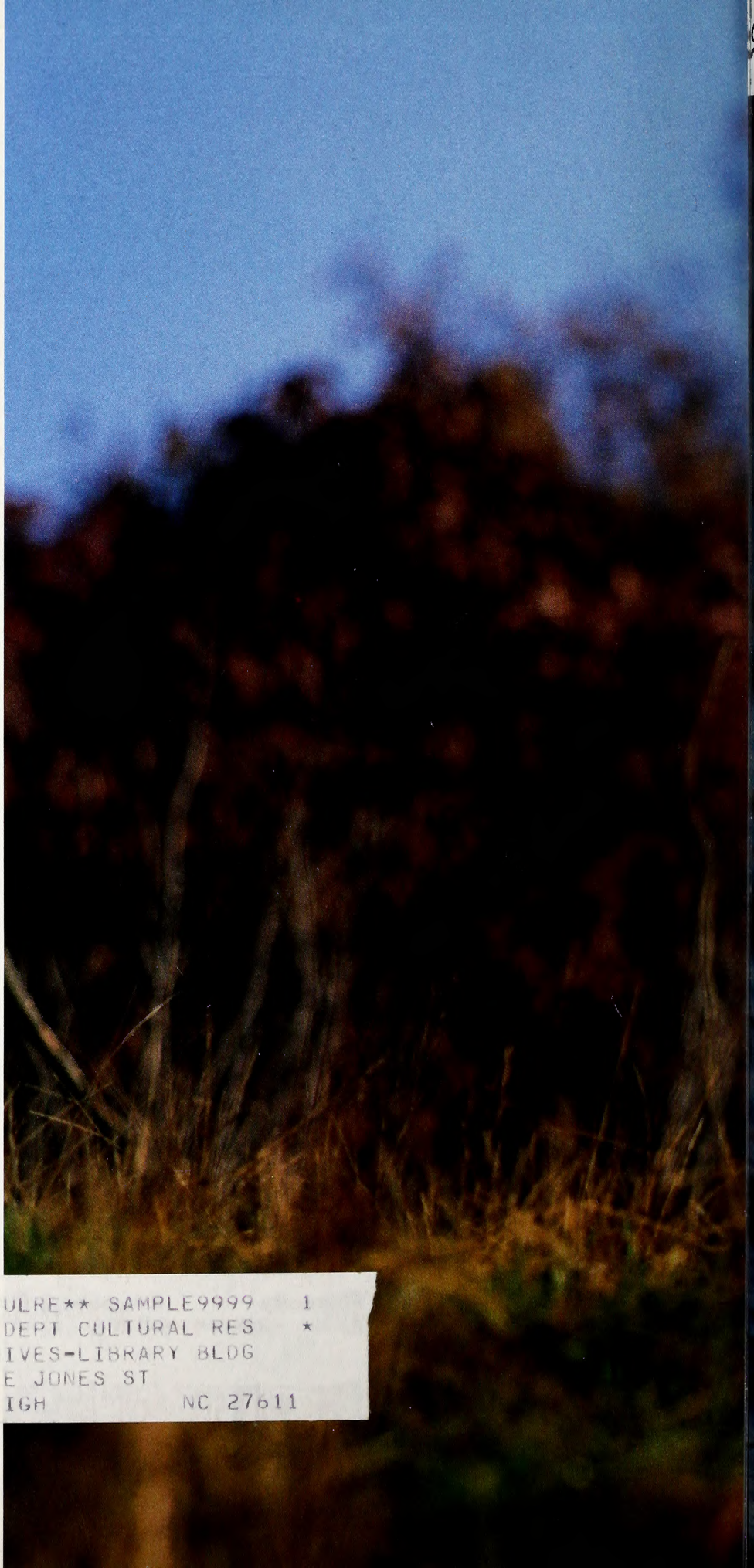
The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on June 30, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	8,344	$2,470,669.32
Lifetime Hunting License	93	16,517.53
Lifetime Fishing License	452	75,096.67
Lifetime Subscriptions to Wildlife in N.C.	295	33,536.33
Contributions	—	39,118.76
	Fund Total:	$2,634,938.61


Lifetime licenses...
One of the keys
to successful hunting.



In The Open

Trophy white-tailed bucks rarely leave heavy cover during daylight unless they're following the doe of their dreams.

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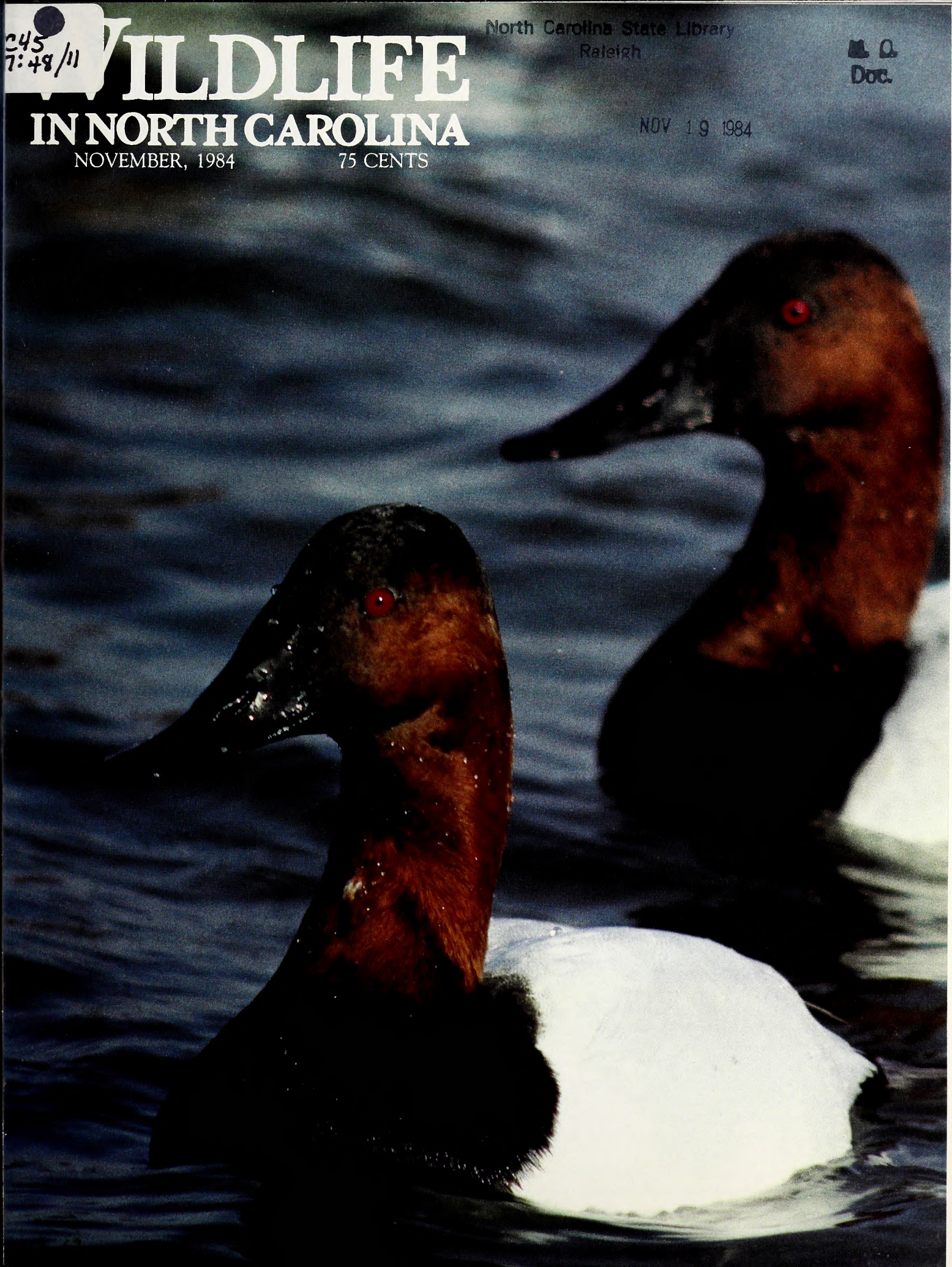

The Last Elk's Legacy

by Jim Dean

The antlers nailed above the door were huge, and my first thought was that the owner of that small mountain store must have hunted in the Pacific Northwest at some time in the past.

"Nope," he replied to my question. "Them horns come from a elk r'at cheer in North Carolina, but I don't know exactly when 'cause my grandpappy shot him."

N.C. Archives & History

The massive rack is undoubtedly from one of the last elk killed in North Carolina, but the origin of this old photograph is unknown.

I encountered those massive elk antlers years ago, and I knew that there might be a good story in them. I'd read that when John Lawson explored North Carolina in the early 1700s, he reported that both elk and woods bison could still be found here although it is doubtful that he actually saw any. And even today the state is full of place names that represent the only links to a lost wildlife heritage. There are places like Wolf Ford, Panther Branch and Buffalo Run, not to mention at least two Elk Creeks and a handful of Elk Knobs, Elk Ridges and many similar places. But elk in North Carolina in modern times?

Part of the mystery begins to unravel in the story of George Gordon Moore's game preserve that was established at Hooper Bald in Graham County. Moore acquired the land in 1909 in return for his services in helping an English company buy a huge tract of virgin timberland in this region. Moore wanted to entertain wealthy friends, and he enclosed some 1,500 acres in 1911 and stocked two sections with four buffalo and 14 European wild boar. Later, he added more buffalo and boar along with six Colorado mule deer, nine Russian brown bears, 25 black bears, 200 wild turkeys and numerous ringneck pheasants. There were also 14 elk.

By the early 1920s, Moore had lost interest in his remote Hooper Bald preserve and sold it to his foreman, Cotton McGuire for $1,000. Soon after, McGuire held a boar hunt for his friends. During that now infamous hunt, the wild boar broke out of their compound and their offspring are still running wild and have spread through parts of western North Carolina, north Georgia and east Tennessee.

As for the elk, many were sold to private individuals, and about 25 were bought in the mid-1920s by the North Carolina Game Division—a forerunner of today's N.C. Wildlife Resources Commission. Some of these elk were released on Mt. Mitchell, and others are likely to have been stocked elsewhere in the mountains. Even though the elk were huge—adults reach 1,000 pounds or more—they apparently prospered for awhile despite hunting pressure. Much of this land was still wild, and the elk were adept at taking advantage of the thick cover.

It is known that some elk also remained in the area around Hooper Bald where they were hunted, and one report indicates that the last one was killed by a Robbinsville man although no date was recorded. Ed Waldroop of Franklin who has worked for the present Wildlife Commission for 36 years recalls that an elk was killed by the brother of a girl he was dating sometime between 1937 and 1940.

"I had heard that some boys from over at Tusquitee had run into an elk over at Nantahala while they were over there fishing and drinking white liquor," Waldroop told me. "They said their dogs had run it, but they couldn't get a shot. Not long after that, this girl told me her brother shot an elk which had come to a fodder or haystack to feed one day when there was snow on the ground. I figured it was the same elk, and it was the last one I heard of being shot."

Jim Todd, an attorney in Lenoir, recalls that the late Bill Crump who lived on a remote part of Wilson Creek in Avery County had mentioned seeing elk as late as World War II—a story confirmed by Archie Coffey of Edgemont.

"They were there all right," Coffey recalls, "I used to see them from a distance in groups of six or seven along Wilson Creek. In fact, some people were afraid to fish the creek because the elk would run them up a tree. They were more dangerous than deer.

"As best I can remember, those elk were stocked in here by the state after 1928 when deer were put in here. For 12 years after those deer were stocked, the hunting season stayed closed and the elk population also grew. The elk were even getting in people's crops, and some of them were shot. I know of three elk that were trapped near the mouth of Lost Cove Creek in the 1940s and taken to Mt. Mitchell to be released, but only one of them survived."

At least one elk was still in the Wilson Creek area as late as 1946 or '47. After the war, Buddy Postell who now has a place at nearby Roseboro, stayed in an old cabin on Wilson Creek for awhile and told Jim Todd that early one morning he saw an elk chewing the bark off an old apple tree in the yard.

"I suspect that's true," says Coffey. "That cabin was built by Bill Crump's brother, Theodore. It was abandoned before the war, but it was still standing. Sometime after the war, a game warden in this area was walking through that area and heard something in that old cabin. When he went to look, he surprised an elk that had gone inside. That elk came out the front door so fast he broke off both his antlers—I guess he must have been about ready to shed them anyway."

And what happened to the antlers? "Well, Ray Sutton—that was the warden's name—brought them to me," says Coffey. "They're over my mantle right now." ⊠

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WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Cover *The brilliant red eye of a canvasback duck is not something most wildlife observers get to see up close, but Eugene Hester used a long telephoto lens to bring this pair within range.*

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White-tailed deer *and* **wild turkey** *eat the fallen acorns from oak trees, but so do a host of other animals:*

Gray squirrel - *Oak, hickory and beech nuts form up to 85 percent of its fall and winter diet.*

Blue jay - *Acorns are the main food of this bird, although it will also eat beech nuts, corn and various berries.*

Black bear - *Acorns are a bear's primary food. Blueberries, apples, grapes, and other nuts and berries also put on winter fat.*

Wood duck - *In winter, a wood duck's crop is likely to be stuffed with oak and hickory nuts. It also eats seeds.*

Bobwhite quail - *Acorns are an important part of this bird's diet, as is lespedeza seeds. It also eats dogwood berries, and seeds.*

Chipmunk - *This rodent stores quantities of hickory, oak, hazelnut and beech nuts in its burrow. It also eats seeds and soft fruits.*

Ruffed grouse - *Acorns, grapes and the fruit and leaves of greenbrier are important grouse foods. It will also eat berries.*

The essential link to life, *mast feeds all wildlife species. There are two kinds of mast: hard mast (nuts and acorns) and soft mast (the seeds of coniferous trees as well as soft fruits on trees, bushes, shrubs and vines). Wildlife eat different proportions of each depending on the season.*

The Curious Cycle Of Mast

written by Lawrence S. Earley / illustrated by David Williams

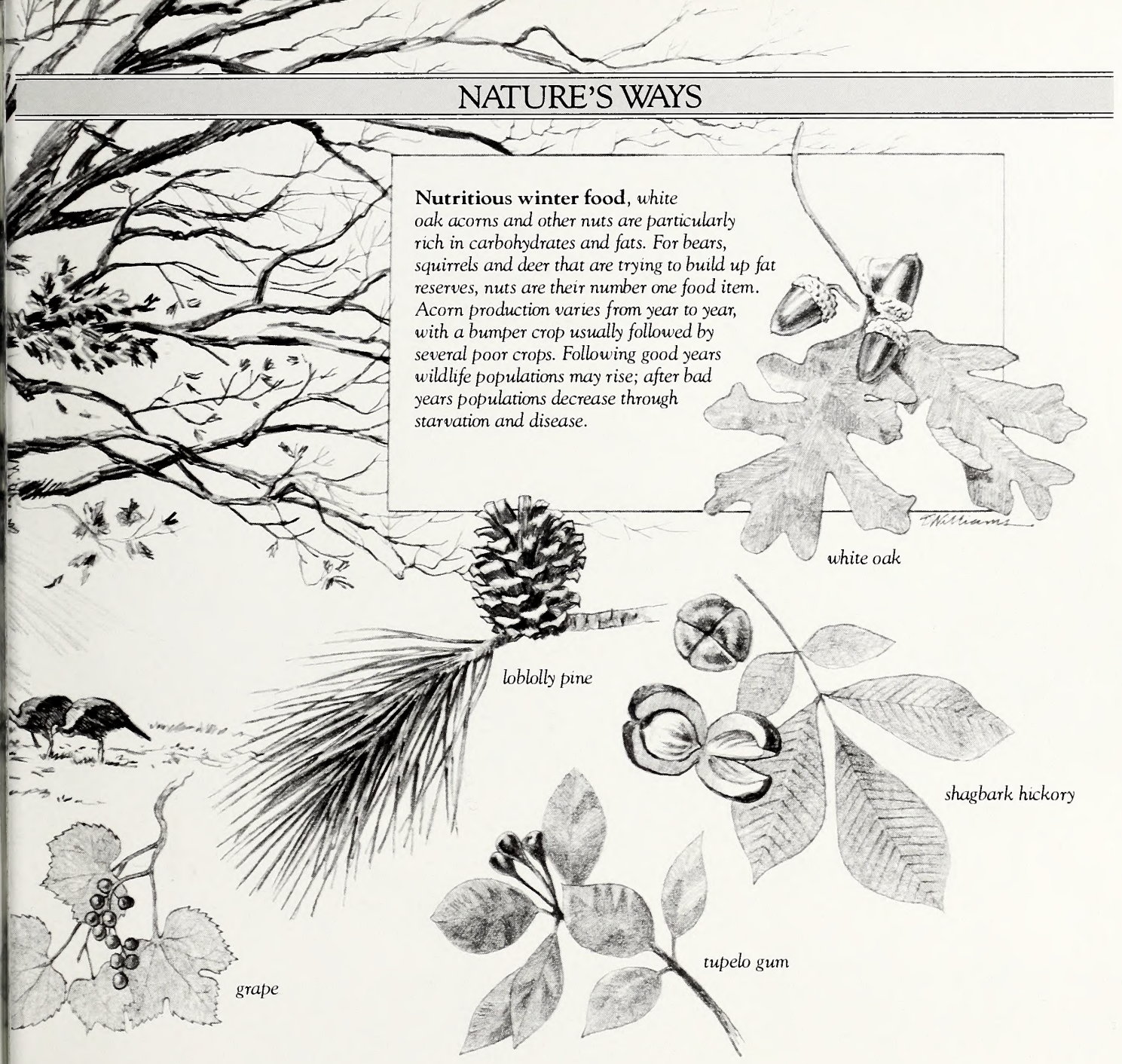
The word "mast" comes from an old Germanic word meaning "food," and it is also related to the Greek word "mastos" meaning "breast." Wildlife managers are probably not surprised, for mast is practically mother's milk to many wildlife species in our forests.

Biologists distinguish between two kinds of mast—hard and soft. Hard mast is the nuts of oak, hickory, beech and other trees. Soft mast includes the seeds in pine cones as well as the fruits of such lower-story plants as flowering dogwood, wild grape, blackberry, blueberry, persimmon and others. The fruits are more important to animals during the late summer and fall. But during the winter hard mast—nuts and acorns—becomes essential for many species.

For example, most of us are familiar with the importance of nuts to squirrels, chipmunks and mice, species that hoard them in burrows and bury them in the ground. But white-tailed deer, wild turkeys, wood ducks and black bears also rely on nuts in fall and winter. Rich in carbohydrates (sugars and starches) and fats, nuts provide an often essential margin of energy and nutrition for deer during the worst of the winter, and hunters have found that during a good mast year a wood duck's crop is likely to be stuffed with nuts.

Good mast years are cyclical, however, and rarely occur back to back. A bumper crop one year will most likely be followed by several moderate to small crops. The effect of this feast-and-famine cycle of mast production on wildlife populations is predictable. In good years breeding picks up and populations rise; following poor years many animals starve and breeding falls off. It is not unusual after a poor mast year for squirrels—to cite one example—to fail to reproduce. They may even resort to migrations in order to find new sources of food.

While poor mast crops are sometimes caused by local weather



Nutritious winter food, *white oak acorns and other nuts are particularly rich in carbohydrates and fats. For bears, squirrels and deer that are trying to build up fat reserves, nuts are their number one food item. Acorn production varies from year to year, with a bumper crop usually followed by several poor crops. Following good years wildlife populations may rise; after bad years populations decrease through starvation and disease.*

conditions — a late spring frost, for example, that kills the flowers — weather does not seem to be the primary cause of mast cycles. Even when conditions are most favorable to acorn production, some mast years are still very poor, prompting biologists to wonder what factors lie behind this phenomenon.

One recent hypothesis is that variable mast yields from year to year are not at all accidental, but a trait that is actually advantageous to the tree. Proponents of this theory go on to say that it is wrong to talk of "mast failure," as if a good mast year were normal. It is the cycle that is normal.

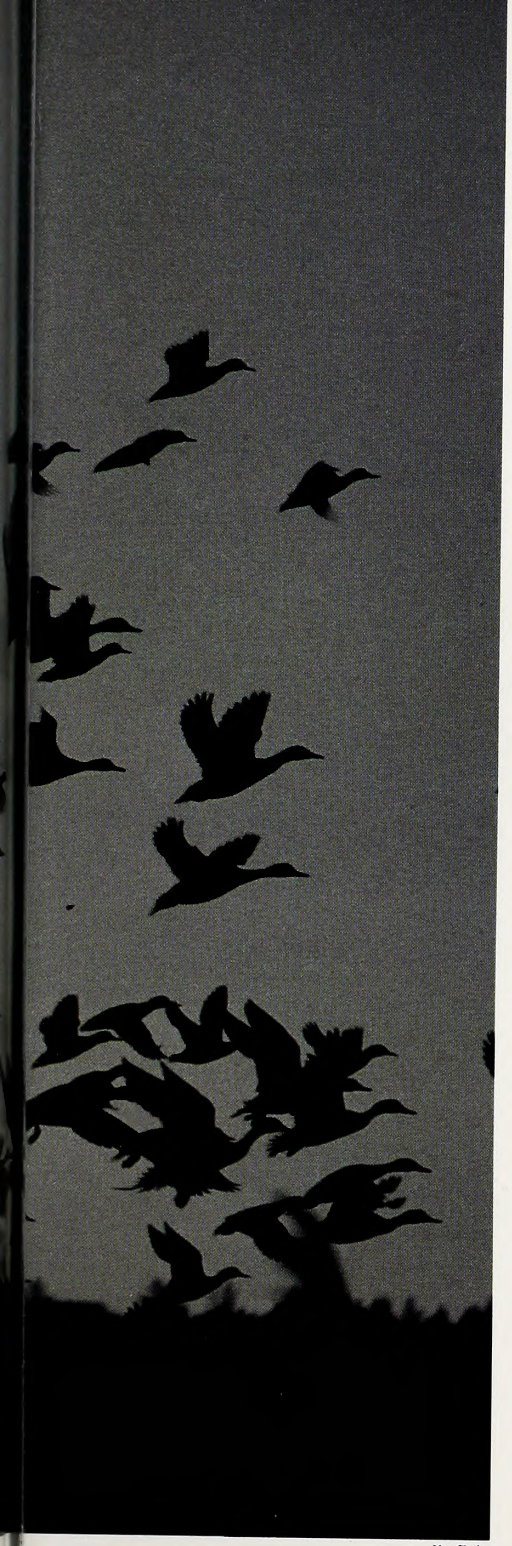
Why is this? If an oak were to produce similar numbers of acorns every year, consumer populations — squirrel, deer, bear, etc. — would rise and eat all the acorns. This would be fine for squirrels and other wildlife species, but not so good for the oak, for the survival of the oak forest depends on at least some of those acorns germinating. Thus the trees that have been most successful in coping with predatory wildlife are those that have evolved cycles of acorn production. After a bumper crop, wildlife populations are overwhelmed by the numbers of nuts. Deer, squirrels and other wildlife cannot increase their populations fast enough to take advantage of this feast, and they leave a surplus to germinate. The bumper crop is usually followed by a poor year. Consumer numbers will gradually decrease through starvation and reproduction failure until the next bumper crop. In effect, the tree has evolved a defense against its seed predators.

Peter Weigl, professor of biology at Wake Forest University, has found support for this theory in his own work with several squirrel species. He says that the Table Mountain pine has evolved a cone that is so heavily armored and positioned so precariously under the branch that squirrels actually *lose* energy trying to get the cone and then eat the seed! So, they generally avoid this cone.

"It's uncanny," Weigl says, "how the seed predator could have affected the evolution of a plant and the defenses it uses. It's a constant battle back and forth between animal and plant, and in some cases, the plant wins." ⊠

Two Different Ducks

Diving ducks and puddle ducks behave differently, and the successful hunter must change tactics when he changes ducks.



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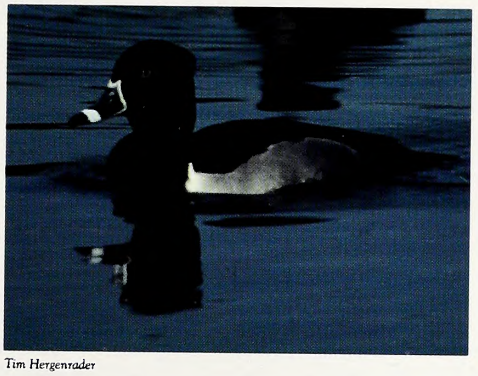


Tim Hergenrader

Rising out of a marsh, these pintails (far left) are among the most common ducks along our coast each winter, but the skilled waterfowler will find that these puddle ducks don't always respond to the same tactics used to hunt diving ducks such as this ringneck (near left).

Bush blinds placed on points on open water can be used to hunt both puddle and diving ducks if you've got decoys representing both types, but skilled hunters often tailor their blind locations and decoy sets to specifically attract either puddlers or diving ducks.

Ken Taylor

by Joel Arrington

It is calm on Core Sound, the surface so flat it reflects wheeling seabirds and my companion's pipe smoke that hangs about the stake blind. Warm sunlight casts shadows of disconsolate decoys on the bottom as we view the still day from our eyrie. Outboards drone far away; gulls laugh hysterically.

Bluebird!

From our elevated box, we are nettled by hundreds of pintails and a few black ducks sitting placidly on the shallow water 400 yards away. The pintails whistle softly, seemingly to mock our puny efforts. A pair of mergansers feeds around our blind, looking like muskrats as they swim with heads submerged. When I peer over the edge of the box one sees me and swims away. Soon the other follows and at a distance they resume diving. Watching them is our only amusement on a slow day. Clearly hunting prospects are poor.

There is little the hunter can do in such conditions to increase his chances, but there is plenty of time to consider the error of his duck hunting ways. We were looking at perhaps 30 mixed redhead, pintail and Canada goose decoys, a paltry stool indeed considering that we hoped to decoy redheads, and especially considering the sleepy raft of genuine waterfowl nearby — competition with our decoys for the occasional duck that returns from some distant feeding spot.

I think we ended up with a merganser and a single redhead that slipped in unannounced that day — probably more than we deserved. We were in the right place, it could be argued, but at the wrong time and with woefully inadequate decoys. Still, it was an opportunity to consider what had gone wrong this and so many other times.

The only thing that qualifies me to write about duck hunting is that I have done it poorly so much. Nevertheless, by random chance, and thanks to guides and expert companions, I have gotten it right occasionally and probably killed a duck or two that wouldn't have come to us otherwise. I do not have all the answers, but I do know this: there is a right way and a wrong way to hunt ducks. True, there is more than one right way, and sometimes you do it right and still fail, because luck plays such a large part. But you can increase your odds by employing tried-and-true methods. These tactics, together with persistence and hard work, will pay off over many seasons, if not right away.

You must hunt diving ducks differently from puddle ducks because the two waterfowl tribes behave differently and prefer different habitat. Of course, there are places where you may pursue both divers and puddle ducks. The big reefs behind Hatteras and Ocracoke in Pamlico Sound are examples, attracting such dabblers as black ducks

Early morning light fires the wings of this pintail as it flares over a set of decoys. Unlike other puddle ducks like mallards or wood ducks, which are found throughout the state, pintails prefer the coastal region.

Ken Taylor

"You can't have too many diving duck decoys. The only practical limitations are cost, room to carry them, and time to put them out. It's possible to crowd small water with puddle duck decoys, however, because dabblers seem to dislike competition."

and pintails, such divers as redheads and canvasbacks; and a ringneck or goldeneye can slip in unannounced whenever you are trying to decoy mallards and wood ducks in some pond or small impoundment.

But as a rule, you employ different strategies and tactics for divers than for puddlers, also called dabblers. With minor exceptions, divers are big-water birds of large flocks. They fly faster than dabblers, run along the water before becoming airborne, and may swim underwater to feed. Their wings are shorter and set farther back on their bodies than those of puddle ducks, which merely tip over to feed in shallow water and spring directly into the air from the water. Dabblers fly more slowly and precisely and may be found on smaller water bodies and in wooded swamps, although they too like big, open water. Divers are more likely to be attracted to large decoy spreads, likely to ignore small ones. Puddlers will come to just a few decoys, but they are generally more wary than divers.

The idea in decoy placement is to get them to look natural while at the same time attracting waterfowl to a point where you can shoot them. You do it out of experience and hunch. No array of decoys is right in all conditions and locations, and there is much nuance involved. Books have been written about it (recommended reading listed elsewhere) and, among hunters, decoy placement is a matter of often fervent opinion and subject to interminable debate.

The basic rules are well known.

Ducks are attracted best to their own kind. You set redhead decoys for redheads, for example, pintails for pintails, and you segregate decoys within a stool. There are exceptions. Teal, widgeon, pintail, gadwall and black ducks will come to mallard decoys. Still, if you have both mallard and black duck decoys out, blacks will usually go to the black duck decoys, and vice versa. The degree to which ducks are decoy specific is especially notable in diving duck hunting. In Pamlico Sound near Swan Quarter, we set old squaw imitations between separate rafts of sea duck and scaup decoys. Almost every time, scaup would go to scaup, sea duck to sea duck, old squaw to old squaw.

Ducks are attracted better to oversize decoys. I would rather have 20 large redheads spread widely than 30 realistically sized decoys. Ducks have little sense of proportion, but good vision. Three giant black duck decoys are plenty for a small cove. In nearly every case, the problem is portability. You can only carry so much.

Divers need a lot of open water between decoys to land in. They will fly over their own kind to land, invariably upwind, at the head of the flock, so you need to keep that in mind when setting your decoys. Puddle ducks, on the other hand, will not fly low over decoys, fearing collisions, but will alight behind their own kind or decoys on the water.

You can't have too many diving duck decoys. The only practical limitations are cost, room to carry them, and time to put them out. It's possible to crowd small water with puddle duck decoys, however, because dabblers seem to dislike competition.

Spread decoys in calm weather, bunch them in bad. This is what ducks actually do.

Puddle ducks such as mallards can be hunted virtually throughout the state on lakes, beaver ponds and rivers, and it takes fewer decoys to attract them than it does the divers which prefer more open water.

Ken Taylor

Setting out decoys at dawn may be a colorful exercise, but this is a job that needs to be completed before it begins to get light. On some days, the only shooting you'll have is during that first legal 30 minutes.

Leave an open spot in the decoys so that ducks will land within ideal gun range. That depends on the type of gun and shells and what is comfortable to the individual hunter. For decoying ducks, I shoot a 12 gauge, 26-inch barrel bored improved cylinder. With it, I am comfortable shooting at birds from 20 to about 40 yards. If long shots are expected, I shoot a 30-inch, full choke which extends my comfortable range to 50 yards. Experts can shoot ducks farther than that. The important thing is to know where you want the birds and set your decoys to attract them there. Some hunters like to place a decoy or two to mark the far edge of range. When I did it, ducks always seemed to sit down just outside them while I fumed.

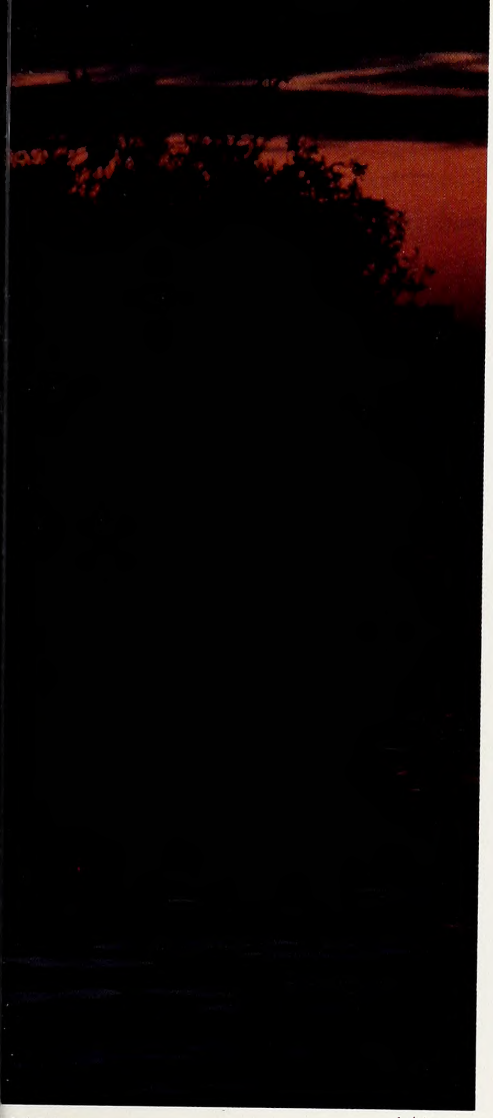
Confidence decoys of species you probably wouldn't shoot or wouldn't expect to attract are recommended. These include seagulls, coots, geese and swans. Probably Canada goose imitations are most popular for this purpose, and, who knows, you might get lucky and a single goose or small flock will decoy. Guide and expert hunter Bob Hester likes snow goose decoys set off to the side when field hunting for Canadas, black ducks and mallards around Lake Mattamuskeet. They are visible for miles. Half a dozen coots to the side of your decoy raft and close to shore will give puddle ducks a sense of security. In some areas, seagulls are similarly employed, although I have never used them. Waterfowl biologist and skilled hunter Dick Brame says he once tried a seagull and attracted so many other gulls, he couldn't hunt. The late guide service operator Vern Berg of Kitty Hawk sometimes used exquisitely carved ruddy ducks as confidence decoys.

The wind should be anywhere but in your face. Generally you want a lee shore, but if the wind is quartering from behind, it's ideal. Ducks land into the wind, of course. Birds will approach with vulnerable breasts and undersides toward the gun. With the wind directly in your face, ducks have to swing over the blind to approach your decoys. Usually they'll see you, and you have tough going-away shots.

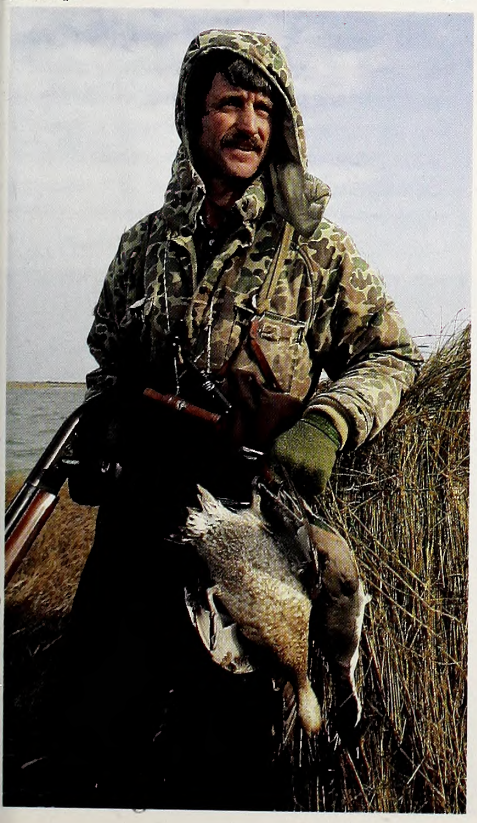
Configuration of decoys in a stool is subject to endless theorizing and debate. There is the "pipe stem," the "C" and the "J," among scores of other systems. Bob Hester has systemized his decoy setting methods that grew out of many years as a guide, and described them in a book that has met with wide acclaim.

There are other ways to hunt ducks than decoying them to your blind. You may float down on singles or small flocks as they feed or rest along the edges of rivers. That would be puddle ducks almost exclusively. A canoe works well, but you have to be very careful about capsizing. Some hunters construct a camo panel up front that quickly falls forward when it's time to shoot. Often two hunters will alternate in the shooting position in the bow, the other steering from the stern. You may scull a low boat up a raft of divers. It is a technique used farther north, mostly for scaup, but hardly ever in North Carolina.

Hunting in frozen fields and over ice is a separate game altogether. If you are sitting over the only open water in the county, you are in a good spot to kill ducks. But you will



Joel Arrington



Joel Arrington

Ken Taylor

Leaving openings in your decoy set not only closely duplicates the way ducks sit on the water—these canvasbacks, for example—the openings also invite passing ducks to land rather than follow their natural tendency to drop in ahead or behind a decoy set.

"Diving ducks will fly over their own kind to land, invariably upwind, at the head of the flock. Puddle ducks, on the other hand, will not fly low over decoys, fearing collisions, but will alight behind the decoys.

not get a shot at the many birds that approach if you overcrowd a hole in the ice with too many decoys.

The degree of confidence hunters have in calling varies over the country. In the bottoms of Mississippi and Arkansas and Louisiana, calling to mallards is highly efficacious, everybody believes it works, and everybody calls. Where mallards and other puddlers inhabit inland swamps and river bottoms in North Carolina, it works just as well. But in my experience, calling of ducks over open water is not particularly effective. Sometimes they come when you call, sometimes not. Sometimes they'll come when you don't call. Most guides I have hunted with blow widgeon and pintail whistles, mallard calls and calls for divers, but I think they blow them for the customers rather than for the ducks. No doubt poor calling is worse than none at all. I have seen some very effective calling of Canada geese in North Carolina, but little or none for ducks, but maybe I haven't been traveling in the right circles. Incidentally, I blow calls whether it works or not.

Where you set up a blind falls more under the heading of strategy than tactics, and it is the most important aspect of duck hunting. The immutable rule is "hunt where they use." Only neophytes believe they can set up just anywhere and kill ducks. In inland reservoirs, rivers, marshes or open sounds, —everywhere—ducks have established flight patterns. They feed at spot A, rest at B. In the early morning they fly across point C, in late evening you may expect them to fly to their habitual roosting spot. It is the hunter's first task to discover these patterns, because to hunt elsewhere will be a slow pick indeed.

One of my biggest problems, particularly on slow days, has been inattention. There is no telling how many ducks, or their descendants, are alive today because I was not watching when they made a single surprise turn over the decoys and went on. I once peered at my decoys through a crack in a blind at Bodie Island and saw one scratch its head. When I jumped, so did the teal and it made its escape. It's hard to stay alert when there is a lot of time between flights, but remember, the price of ducks is eternal vigilance (and a lot of dollars).

Ed Zern used to say "you can never beat luck with brains," and it's true. I would rather be lucky than smart, but, in duck hunting at least, you can be just as lucky when you are hunting smart as when you are not. In the long run, a combination of good fortune and good tactics will put more excitement in your hunting day and more ducks on the table.

Some recommended reading:

Ducks, Geese and Swans of North America, by Frank C. Bellrose, 540 pp., Stackpole Books.

Misty Mornings and Moonless Nights: A Waterfowler's Guide, by Norman Strung, 253 pp., Macmillan Publishing Co.

Successful Waterfowling, by Zack Taylor, 276 pp., Crown Publishers.

The Wings of Dawn, by George Reiger, 320 pp., Stein and Day.

The Secrets of Decoying Ducks and Geese, by Bob Hester, 32 pp. with decoying calculator, from Bob Hester, Route 1, Fairfield, NC 27826. ⊠

A pair of pintails is the payoff for this waterfowler's skill, but the shooting is only the final and, some would say, least important part of the hunt.

The World Is Her Oyster

by Lundie Spence

The tiny female pea crab is an amazing tenant, sharing room and board with an oyster. But the real question is, "Will you, or won't you?"

When it comes to eating raw or steamed oysters there are two kinds of people: those who eat pea crabs and those who don't. There is probably a third type too, those who eat a pea crab and never know what that soft crunch is.

Knowledge of pea crabs and their alleged powers separates a novice from the experienced oyster eater. Myth has it that an oyster bed infested with pea crabs yields better oysters. Furthermore, eating pea crabs supposedly increases virility, and since oysters share that reputation, it is obvious that the ingestion of a pea crab perched on an oyster is a potent double shot. Then, there are those who say oysters with pea crabs have better flavor.

In colonial times, pea crab soup was a winter pleasure. The recipe called for a quart of pea crabs slowly cooked with cream and sherry. If you consider that the little crustacean is only somewhat larger than a green pea and that it is not in every oyster, a quart of pea crabs represents quite a collection of shucked oysters. It reminds one of the old Virginia recipe for oyster stew: "Take twelve dozen oysters, steam open, save the juices. This is the base for the stew. Add twelve dozen freshly shucked oysters, butter, and milk, heat and serve." Obviously, two hundred years ago, coastal families ate a lot more oysters than they do today, and they must have had the opportunity to eat more pea crabs, too. Even today, where there is a demand for pea crabs, the market price per pint is higher than that for oysters.

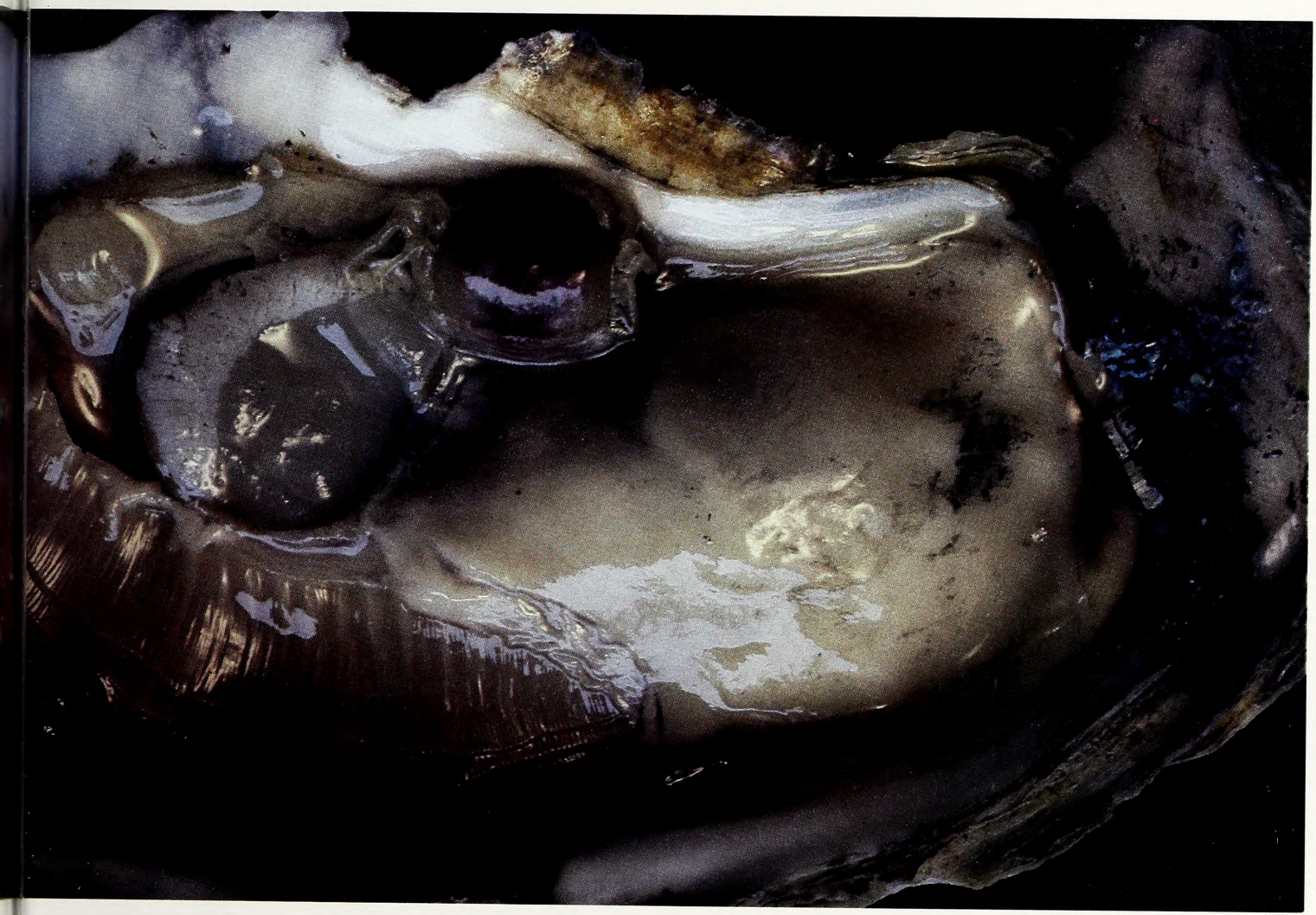
Pea crabs tend to nestle between the gills of an oyster and are often overlooked. Living, they are a pale gray color, although the light orange colored gonads which produce eggs usually show through the translucent carapace. The body is rounded with slight, jointed legs bent underneath. If you touch the carapace, it is soft and yielding. Steamed pea crabs turn reddish-orange, similar to a cooked blue crab or lobster, and the dot of color in a steamed oyster is hard to miss.

Naturalists and oyster eaters have known about these oyster crabs (*Pinnotheres ostreum*) for a long time. However, not until the 1920s was its life history studied. Recent research continues to discover more larval stages and the degree to which the adult affects the host oyster. Pea crabs live in animals other than oysters. Scallops, tube worms and pen shells may host the creatures, although the crab's living habits are the same.

The pea crab is a symbiotic organism which means it lives together with another animal. Symbiotic relationships can be subdivided into various catagories, and the pea crab fits two of them. When the pea crab and the oyster live in harmony, the relationship is called commensalism. Neither does the other harm, yet the oyster with its shell inadvertently protects the pea crab. How-

In this symbiotic relationship, the pea crab has the best of it, gaining the protective shelter of the shell and a source of food. As for the oyster, the only benefit it gains is a companion that only occasionally nibbles on its gills.

Joel Arrington



Joel Arrington

ever, when times are hard, the pea crab may nibble at the oyster's gills, and this relationship is called parasitism. The pea crab gains protection and harms the oyster, but doesn't kill it—much like a tick on a dog. Pea crabs apparently have the best of it in this relationship since there is no evidence that the oyster benefits. In some symbiotic relationships, both creatures profit.

Almost every pea crab in an oyster is female because the male pea crab is more mobile. To check, turn the crab over and if the abdomen flap is large and U-shaped, it is a female. In summer, most females will be carrying five to ten thousand eggs under this flap. Cooking these would give you a pea she-crab soup.

Once a female pea crab is impregnated, she may lay several batches of eggs. Each batch is carried within her abdomen flap three to five weeks, changing from a bright orange sponge to dark brown. Pea crabs, like butterflies, start life in a form quite different from the adult. When the eggs hatch, the newly emerged creatures, called *zoea*, have feathery legs and a shrimp-like body. *Zoea* are planktonic, drifting passively with water currents. They filter even smaller plants and animals for nourishment. Within a month, the larva changes form several times. Scientists have identified four forms of *zoea*, one *megalops*, and the final crab stage. The males and females in the first crab-state are tiny—less than a millimeter in width. Swimming weakly in the water, they search for their oyster host. Finding an oyster bed is like coming home.

Small pea crabs usually find homes in immature and newly settled oysters, called spat. Actually the crabs can invade any size oyster and tend to survive better in the yearling oyster. Even though several crabs may invade a single oyster, by spring only one large female remains. She will never leave her oyster host. Her body has gone soft and the spindly legs weaken even further. Outside the oyster, she could not even walk—easy prey for a passing fish.

Unlike the female, male pea crabs are not confined to the oyster. They are smaller, more flattened, and have a harder carapace for protection. Males move from oyster to oyster impregnating female crabs. They live about a year, dying in the fall or early spring. The females may survive up to three years.

Adult pea crabs feed with their pinchers. They pick off mucous strings formed on the gills of the oysters in which detritus and microscopic plants and animals have been trapped. Apparently, when the oyster is not filtering and entrapping enough food for the pea crab's appetite, the crab eats the gills themselves. Gills grow back, so the oyster is not impaired for long. However, research has shown that oysters with adult pea crabs do grow more slowly than those without.

The next time you join an oyster roast, watch for the pea crab. She may seem pretty insignificant—a small orange crunch—but she's been around. Before she settled down, she floated with tidal currents, explored warm sound waters, and changed radically into a bottom dwelling creature in search of home and host. Once she found the sheltering valves of an oyster, she hatched thousands of eggs and may have lived several years. That pea crab knew every gill filament and bump in her oyster, and indeed could not live without her host. The pea crab and the oyster belonged together, and if you eat both, you're likely to agree. ⊠

Jay Davies

Jay Davies

FOLLOWING THE FRENCH BROAD

The traveler who follows the French Broad River along its journey through western North Carolina will learn much about this region's natural history.

by Jay Davies

The air is thick with dampness as fog creeps up the valley floor towards my balsam-shrouded perch atop Devil's Courthouse. Except for the wind, all is quiet while I trespass in this primeval environment. This rock outcrop is rough and cold and as my hand moves across its crystalline surface, I drift back in time, back nearly a billion years, when the rocks of the French Broad were just beginning to take form from the slowly cooling, molten magma covering the earth's surface.

Over the coming millennia life will make its debut, struggling first as a single cell and later as plants, invertebrates, fish and more advanced forms. A titanic collision between Europe and North America will cause a tremendous buckling of the earth's crust along the eastern seaboard of the United States. The precambian rocks will be fractured and tilted; their jagged shards thrust skyward to form the Appalachian Mountains. Over time erosion will continue to modify the topography, but already the course of the French Broad River has been predestined.

I met the French Broad as a stranger. The North Fork and the Davidson, Stackhouse and Shelton Laurel were only names to me, but that was before I traced the river's route from its origins near Rosman to the Tennessee line, watching as it rushed onward into Tennessee toward its marriage with the

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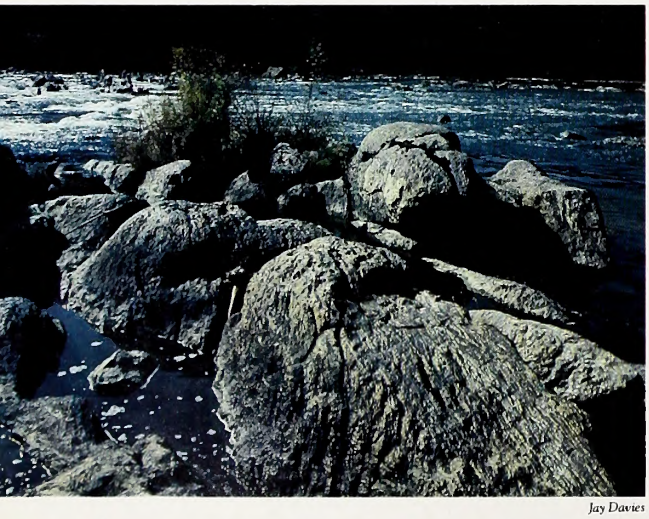
High atop Devil's Courthouse in Transylvania County, two hikers survey the North Fork watershed, birthplace of the French Broad River. The view is spectacular (above). Gathering strength in these spruce-and-fir highlands, the river flows first south and east, then north through four mountain counties of North Carolina before emptying into the Holston River, 217 miles away. Devil's Courthouse, got its name from a jagged black rock 5,740 feet high.

Jay Davies

"I traced the river's route from its origins near Rosman to the Tennessee line, watching as it rushed into Tennessee toward its marriage with the Holston River at Knoxville, 217 miles from its source."



Jay Davies

A historical link between mountain towns like Marshall (top), the French Broad was a vital trade route for lumber and other goods. The county seat of Madison County, Marshall was an important trading center. In southern Madison County (above), rapids provide enjoyable whitewater canoeing.

Holston River at Knoxville, 217 miles from its beginnings. I followed the river through Transylvania, Henderson, Buncombe and Madison counties, places rich in history and mountain lore. I talked to the people who lived on its banks and listened to what they had to say about the river. I read the histories and the scientific accounts.

From all these sources I learned what lavish provision the French Broad has made for man. For man has long been a part of the French Broad, hunting game in her forests, building homes from her timber, farming her rich valleys, eating her fish and drinking her water. The river offered a highway from the heartlands of the nation through the almost impassable Appalachians to the market places of the deep south. She gave clean and abundant water to new industry.

In exchange for all that, men too often sullied the gift, turning her clear water muddy with siltation and clogging it with wastes.

Early explorers called wide rivers "broads," and because this one flowed toward the French Territories, she was called the French Broad. Of course in the highlands of the North Fork in Transylvania County the river is hardly more than a rivulet yet. Sentinels of Fraser fir and spruce stand guard. The journey of these trees south from Canada with Ice Age glaciers occurred in the wink of an eye compared to the age of the river. This island refuge high atop the Pisgah Mountains provided a hiding place where the trees could live when the climate warmed and the ice melted.

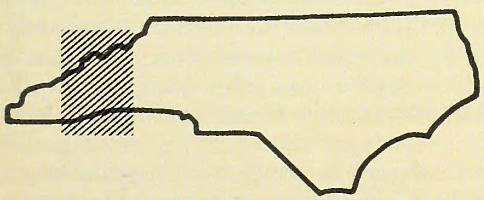
The West and North Forks have a geologically youthful appearance. Their waters cascading across boulders and rubble bespeak their ravenous appetite to erode their beds in a frenzied attempt to lessen their grade and achieve a more mature, meandering state. These streams are clear and cold; their gravel bottoms are free of choking silt and rich in aquatic insect life. Brook or "speckled" trout, as they are called locally, persist in the headwaters, while the secretive brown and flashy rainbow dominate the main stream.

Downstream from Rosman, the river follows a lazy, meandering course through a broadening agricultural valley. Stark white and grey sycamores line the earthen banks. I floated this section of river and as my canoe glided over the sandy bottom I wondered what the stream was like 200 years ago. Historical records of similar streams in North Carolina tell of water so clear their gravel bottoms in pools several feet deep appeared only a few inches under the surface. I have found no reason why the French Broad should not have been equally endowed.

The French Broad River

From its headwaters high in the Pisgah National Forest above Rosman to the Tennessee State Line just north of Hot Springs, the French Broad River runs basically free and unfettered throughout North Carolina. The river has escaped the massive impoundments that have reduced many other rivers to little more than a series of lakes. Also, the French Broad is much cleaner than it once was, the result of a concerted effort to reduce pollution.

Because of this, the French Broad River is rather unique among major rivers today, and it also remains a waterway of significant historical importance. Some of the key points of interest along its length are shown here, but if you really want to explore the French Broad, follow it by foot, automobile and canoe.



0 5 10 15
Miles

Lavish 19th century health spa

Hot Springs

Stackhouse

Whitewater canoeing in Class III, IV and V rapids with names like "Surprise Ledge" and "Needle Rock"

TENNESSEE

NORTH CAROLINA

19

MADISON CO

23

Marshall

Site of mythical "Dakwa"

River 1,000 feet wide in places (panfish, catfish, muskie)

70

40

MADISON CO

BUNCOMBE CO

Alexander

Busiest "watering hole" on east bank in 19th century as a livestock trading center

Blue Ridge Parkway

Woodfin

Asheville

40

Swannanoa River valley, a pathway for pioneer families moving west from Old Fort

26

Bent Creek

Biltmore Estate, house and gardens open to public; early 20th century living on the grandest scale

74

BUNCOMBE CO

Blue Ridge Parkway

River widens, numerous shoals

HENDERSON CO

25

Scenic highway follows ridges for 500 miles between Shenandoah and Great Smoky Mountains national parks

64

TRANSYLVANIA CO

Hendersonville

HENDERSON CO

Pisgah National Forest

64

Final resting place of Mountain Lily, ill-fated river steamboat, in 1881

NORTH FORK

Brevard

176

Headwaters (trout)

FRENCH BROAD RIVER

WEST FORK

River narrows, rocky and canopied by trees (smallmouth, muskie, panfish, catfish)

276

NORTH CAROLINA

SOUTH CAROLINA

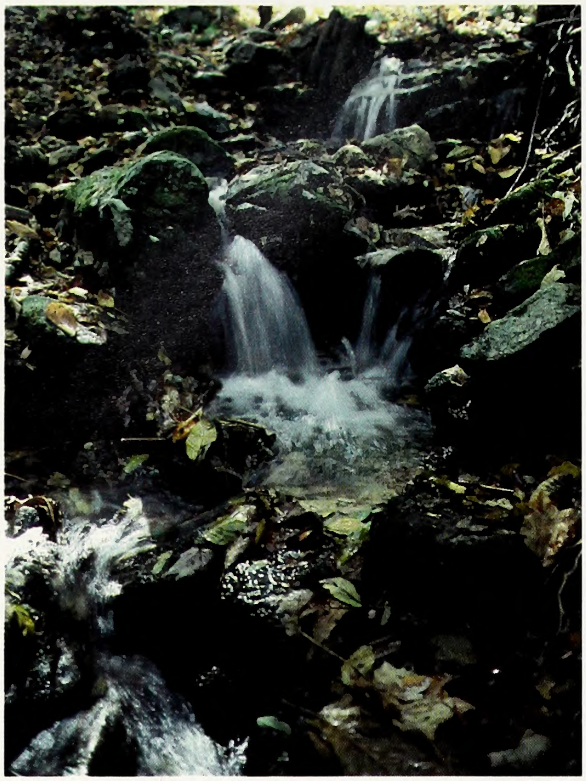
North, West and East Forks join

64

Rosman

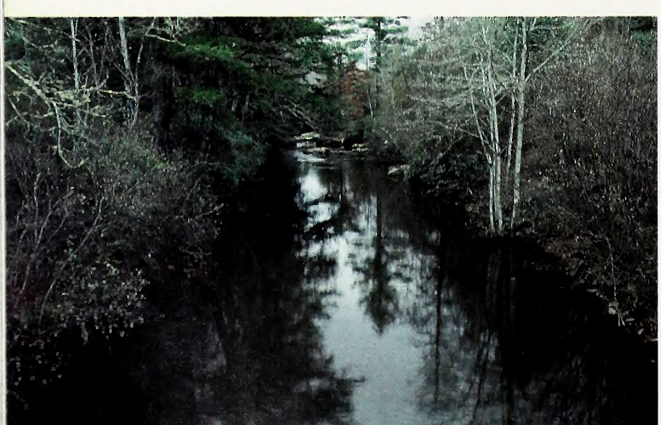
EAST FORK

N



Jay Davies

"As my canoe glided over the sandy bottom I wondered what the stream was like 200 years ago. Historical records tell of water so clear that gravel bottoms in pools several feet deep appeared only a few inches under the surface."



Jay Davies

Fickle by nature, the French Broad changes its personality throughout its length. From the pleasant tributary cascades that form the North Fork headwaters (above), the river widens and slows in Henderson and Buncombe counties. Below Asheville, near Marshall and Hot Springs, the river tumbles in dangerous rapids that have claimed the lives of several unwary canoeists.

As I gazed upon the river's bottom I realized I was observing the legacy of a century of reckless development and careless exploitation of the land. Today siltation is considered the single most destructive pollutant in North Carolina. Expensive filtration systems are needed to remove suspended sediment before the water may be used and erosion of topsoil increases the cost of agriculture.

The French Broad is still cold enough downstream of Brevard to provide a respectable trout fishery. Surprisingly, large brown trout are caught each year in small tributaries like Boylston Creek, located near the border of Transylvania and Henderson counties. Some biologists theorize the large trout are nomads that move into these cold tributaries to escape the warm summer temperatures of the river.

The river downstream from Brevard was not always so clean, however. Bill Allen of Swannanoa recalled a large fish kill that occurred in the mid-1950s. "I'd say every species imaginable was killed: largemouth and smallmouth bass, sunfish, catfish up to 40 pounds, carp as large as small hogs and giant black crappie. Crayfish climbed out on the banks and every tributary, no matter how small, was packed with fish trying to get away from whatever was killing them."

In fact, the French Broad was severely polluted by domestic sewage and industrial wastewater through the 1950s and '60s. According to Heath Dobson, an Environmental Engineer with the N.C. Division of Environmental Management located in Asheville, the pollution completely depleted the oxygen content of the river in some sections and rendered it unsuitable for fish and wildlife propagation. Once looked upon as a valuable resource, the river was viewed with scorn. "Just throw it in the river, it's a dump anyway," became common advice for disposing of garbage and trash.

To some extent this attitude persists today. I talked with the manager of a gravel mining company located on a tributary of the French Broad. He could see the importance of cleaning up the nation's streams, but felt some had to remain as dumps to accomodate industry. His attitude depressed me for he saw only limitations in environmental protection regulations, while I saw them as opportunities for improving our quality of life.

Near the Henderson-Transylvania county line is where the steamboat *Mountain Lily* met her Waterloo. She was an ambitious venture by the French Broad Steamboat Company to provide river transportation between Asheville and Brevard in the late 19th century. These "men of vision" exploded tons of dynamite to remove stubborn rock shoals, and constructed massive jetties to deepen the river. Scarcely had she started her maiden voyage, however, when a flash flood swept the *Mountain Lily* from her moorings and she sank. Mud and debris packed the jetties and the *Mountain Lily* rotted into history.

Henderson and southern Buncombe counties are broad agricultural flood plains and the river is nearly 75 yards wide in places. Here, less shaded by the trees lining its banks, the river is partially weaned from its dependency upon organic matter washed into it and begins to support itself with solar energy trapped by microscopic phytoplankton and other algae growing within it. The river bed is lined with sand, but as it nears Asheville, rock shoals become numerous.

Old newspapers often show pictures of anglers holding yard-long muskellunge caught from this section. Pollution was thought to have exterminated the species by the late 1950s, but thanks to the recent cleanup of the river and stocking efforts by the N.C. Wildlife Resources Commission the crafty, elusive and savage nature of the musky are sovereign qualities able to be appreciated by a growing number of Tar Heel anglers. "The musky provides a challenge that's not matched by other species," says Bill Allen of Swannanoa. "Once he sets his mind to hit, he'll just fascinate you." Bill has seen them hit a boat attempting to grab a plug and yet other times he has watched them make a run and just as quickly stop without hitting. "It's uncanny," says Bill, "but when they do that, some of them will roll their eyes at you as if they are saying, 'Fooled you, didn't I'."

The Swannanoa River enters the French Broad at Asheville. Her once pastoral valley provided a pathway for pioneer families moving west from Old Fort, N.C. and in later years became a trade route. Manufacturing concerns moved to the Swannanoa's banks and along with them came pollution. By the middle of the 20th century, chemical pollutants were being regularly poured into the river and trash was everywhere.

Curtis Wooten

Bob Watts of Black Mountain canoed the river in the early 1970s. "I was appalled at the amount of man-made junk in the river; plastic milk jugs and garbage bags, rusting automobiles, tires and garbage were everywhere. People had a hopeless attitude toward the river, everyone dumped stuff in it and no one thought anything could be done about it."

A member of the Black Mountain-Swannanoa Jaycees, Bob talked to the membership about cleaning up the river and a following Saturday, he and 10 other members were standing on the river's bank. "That first day," said Bob, "we were only able to pick up the small stuff in a short section of the river, but it was enough." Word of the project spread throughout the community. One company donated a large crane to remove the automobiles and heavier trash. Local governments, institutions and private business donated other equipment and manpower. Landowners cleaned up the river bordering their property. Numerous citizens volunteered and even passive onlookers caught the fever and went home to get chain saws and rakes. Gradually the river improved until today it is classified trout water and stocked by the N.C. Wildlife Resources Commission.

A mile below Asheville the river assumes a different personality. What had been an almost gentle, meandering matron becomes a cascading, impetuous vixen. "Agiqua" was the name given the French Broad by the Cherokee Indians, but the whitewater cascades below Asheville were called "Untakiyastiyi"—"where they raced." Whether or not the Cherokees raced their canoes here is unknown, but the name vividly depicts the excitement which must have been generated in their hearts by this tumbling stretch.

The Newfound Mountains line the western horizon of Buncombe and Madison counties and streams like Turkey, Sandy Mush and Spring Creek drain their rocky slopes. Agriculture is prevalent and the rolling hills are green in pasture.

This tranquil atmosphere, however, was ripped asunder in November 1977 by a 100-year flood which plowed its way through the French Broad Valley. Damage was extensive as swollen creeks washed across unprotected floodplains and gouged new channels through valuable cropland. Federal disaster relief funds poured into the area and I was assigned to a team of specialists who helped recommend how the money should be spent.

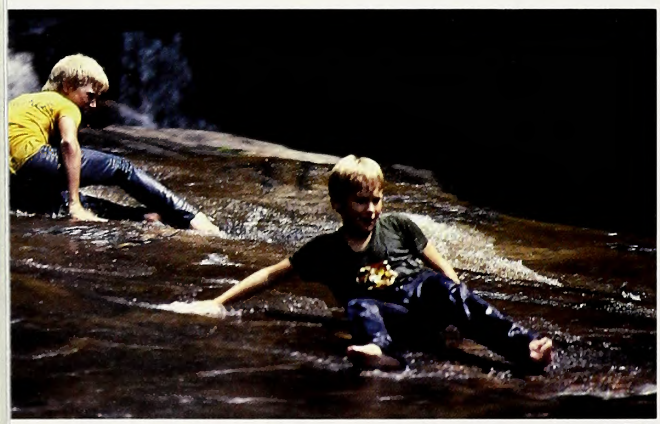
That winter I visited farms within the stricken area, helping determine the best way to rebuild the damaged land without causing further stress on the

Curtis Wooten

Architectural treasures from the past are visible along the French Broad's banks. The Amos Stackhouse House (top), an early 20th-century home in Madison County, is evidence of the wealth that early lumber and trading operations brought some mountain people. In Hot Springs, Sunnybank (above) dates from 1875, one of the town's most important survivors from its heyday as a resort. Thermal springs gave Hot Springs its name and fame, as it became a favorite mountain resort from 1800 to 1920.

Jim Dean

"Carl Murray tells of catching 20 smallmouth bass in a day. Taking me aside he whispers about a special place on Ivy Creek where I am guaranteed to catch a smallmouth on the first cast."



Jay Davies

Recreational opportunities abound along the French Broad. Children while away an hour's time sliding on rocks in Transylvania County's Looking Glass Creek, and cocky canoeists may try their luck on Class III, IV and V rapids near Hot Springs. The river is a fisherman's delight, however. Trout prowl in the riffles and pools of the headwaters, while savage musky give the river a national reputation. Smallmouth bass, channel and flathead catfish are some of the other sportfish sheltered by the river.

heavily damaged streams. It was puzzling at first how some fields had been extensively eroded by the raging waters, while neighboring land was left relatively untouched. Gradually the evidence built until the cause of the disparity became clear. Farmers who had plowed right up to the stream's bank were usually the worst hurt, while those who had left a buffer strip of native vegetation consisting of trees and shrubs experienced little damage. The narrow buffer strips, often only 10 to 15-feet wide, had stabilized the stream banks and prevented the channel from wandering through the adjacent fields. The vegetation had also reduced the velocity of the overflowing creek and thereby lessened its ability to erode the topsoil as it flowed across the land. Unfortunately, many landowners have continued to farm right up to the creek despite continued efforts by the U.S. Soil Conservation Service and others to promote good soil conservation practices.

Following the flood, many landowners chose to channelize the streams on their property in an attempt to reduce future flooding. This shortsighted practice not only devastated the aquatic habitat for fish and other aquatic life, but greatly increased the likelihood the stream will flood sooner on neighboring landowners downstream.

As I pass into Madison county the river is 1,000-feet wide in some places, tumbling over a stream bed strewn with rock ledges, boulders and gravel shoals. Small islands are common and the water is usually muddy and warmer as very little of the river is shaded from the sun's rays.

The sporty smallmouth bass are plentiful in these shoals and Carl Murray of Marshall tells of catching 20 of the scrappy fish in a day, mostly in the 1- to 2-pound range, but every once in a while a 4 pounder. Taking me aside he whispers about a special place on Ivy Creek, located on the southern edge of Madison County, where I am guaranteed to catch a smallmouth on the first cast.

The deep holes in this section of the French Broad often produce trophy musky and large stringers of channel and flathead catfish or "yellow cats." A 50-pound flathead was caught near Hot Springs a few years ago and 20-pound fish are frequent. Fishing for these monsters is the "sit and wait" type with chicken livers the preferred bait, but don't be lulled into thinking this is a lazy man's sport, because once these giants are hooked they make strong surges along the bottom and never seem to tire.

Alexander, a small community located 10-miles north of Asheville on the east bank of the French Broad, consists of only a few stores, a gas station

and some homes, but 150 years ago it was the busiest watering hole on the Buncombe Turnpike. Completed in 1828 and considered one of the finest toll roads of the time, the Buncombe Turnpike ran along the east side of the river from Asheville to Hot Springs and linked the markets of South Carolina with the agricultural heartlands of Tennessee, Kentucky and Ohio. Through the middle and late 1800s, droves of hogs, cattle, mules and even turkeys were a familiar sight on the Pike as they were herded to sale. To accomodate the weary drovers and their animals, "stock stands" were built. Alexander's was king, consisting of a general store, blacksmith shop, sawmill, gristmill and even a hotel. Here and at others like it, the animals were fed, watered and sheltered for the night, while the drovers were provided solid, hot meals and a bed.

The lusty way of life along the Buncombe Pike faded into the past by the mid-1880s, when the Western North Carolina Railroad Company completed the last section of track linking Morristown, Tennessee, with Old Fort, North Carolina. The railroad brought prosperity to isolated Madison county. The ring of axes and crosscut saws echoed through the valleys as her vast stands of virgin oak, chestnut, poplar and hickory were harvested. Marshall, the county seat tightly sandwiched between the river on the west and the mountains on the east, emerged as a major trading center. Marshall's fortunes have not been without cost as her Scotch-Irish residents have been repeatedly flooded. Invariably when the waters receded, however, they shoveled out the mud from their kitchens and stores and began anew.

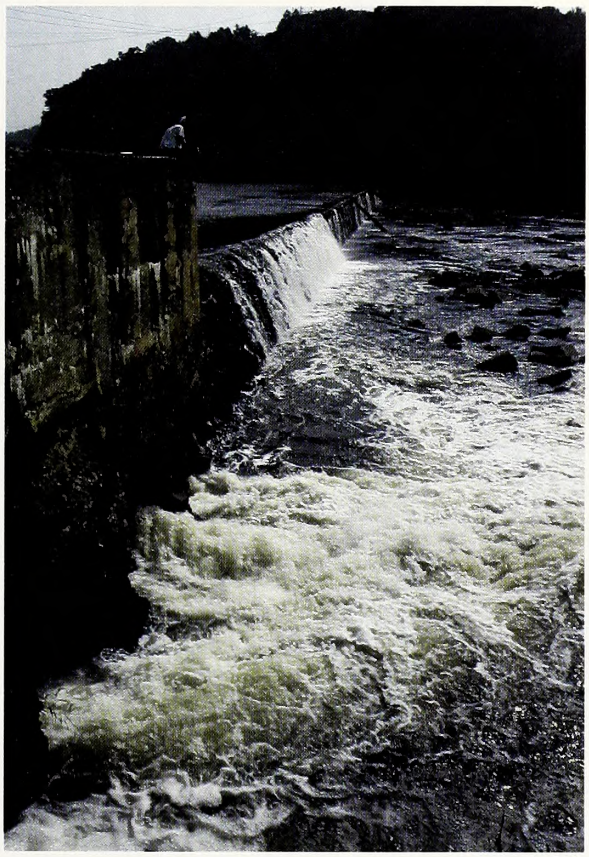
A few miles downstream from Marshall, according to Cherokee legend, is the location of the mythical "dakwa," a gigantic fishlike monster which lurked in the deep pools, plucking men from the bank and devouring them beneath the river's murky water. The basis for this legend, like so many others, remains a mystery, but this section of river still claims the lives of unwary boaters and names like Surprise Ledge, Frank Bell Rapids, The Maze and Needle Rock foretell the treacherous nature of this section which may have inspired the legend.

Hot Springs is the last town on the river in North Carolina. Formerly Warm Springs, it was a lavish health spa and tourist resort of national fame during the 1800s. Guests from near and far made regular pilgrimages to the beautiful Warm Springs Hotel to partake of the purported medicinal benefits of the area's mineral waters. A visitor to the hotel experienced southern grandeur in its finest form. The accommodations were exquisite and the leisure activities included golf, tennis, billiards, riding and bowling.

What does the future hold for the French Broad? Thanks to an awakening awareness of the value of the river, the future looks bright. Asheville is making plans to use the river as a source of drinking water in the not too distant future. Municipal and industrial wastewater treatment facilities have been constructed and the river is once again being used for recreation. Whitewater rafting and canoeing have developed and the river provides some of the best musky fishing in the nation.

Each year the Land-Of-Sky Regional Council, a governmental agency, coordinates citizens, business, civic and governmental organizations in sponsoring activities such as river cleanup float trips, shopping mall displays and seminars which emphasize the importance of keeping the river clean and celebrate French Broad River Week. A volunteer citizen's group, the French Broad River Foundation, has members from all four counties through which the river flows in North Carolina and others, who have banded together to continue the river cleanup. The Foundation has recently been awarded a grant from the Z. Smith Reynolds Foundation, through the N.C. Department of Natural Resources and Community Development, to establish a Stream Watch group which will conduct educational events helping the public learn about the river, its value and problems. Siltation, garbage and plastic milk jugs are still a problem, but now local citizens take offense when "outsiders" criticize her.

What is a river? She is a reflection of ourselves. If we have a selfish, shortsighted approach to our environment and exploit it at every opportunity; we will visualize the river as a tramp and treat her accordingly. But if we are good stewards of our natural resources and use them in a way that does not diminish their value for future generations, then we will see the river as a lady, to be respected and valued for the richness she provides in our lives. ⊠



Jay Davies

It's water over the dam for this fisherman at a dam north of Asheville. Once sauger migrated upriver from Tennessee and sauger fishing became a popular springtime activity. Dams like this one blocked the migrating fish, although now the N.C. Wildlife Resources Commission is recommending fish locks be installed to permit the sauger to pass.

Beware The Bite

The risk is very, very small, but some wildlife species actually can carry and spread rabies.

by Mark Taylor

I didn't give the dog much thought at first. I was helping a friend clear brush on his family's farm when we noticed a nondescript black mongrel approaching from the barns. Something seemed wrong, though. The dog was ambling aimlessly, and his walk was, well, funny.

"That dog looks strange," said Howard, leaning his axe against the shed and eying him thoughtfully. "I've never seen him around before. Must be a stray."

"Yeah," I said. "You know, he almost looks sick."

We began working again, and I realized it was the animal's shambling gait that bothered me. As he came closer he occasionally staggered. His head hung low to one side, and his lower jaw gaped. When the dog looked at us his face contorted into a grotesque grin and his eyes seemed to roll upwards in their sockets.

Suddenly, I remembered that the family on a neighboring farm had recently taken a painful series of shots for rabies exposure after the disease had been discovered in their dairy herd.

"Howard, let's get out of here," I said, backing towards the house. "I think that dog might be rabid."

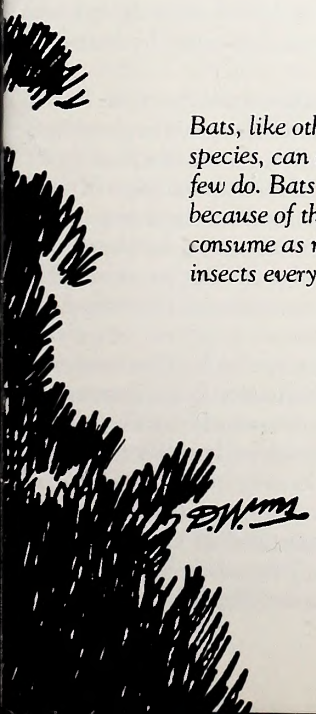
What I was feeling for the first and one of the few times in my life was cold, primitive, gut-twisting fear—and for good reason. Rabies epidemics that originated in fox populations in Canada regularly swept through that wild section of northern New England. We were glad to reach the safety of the house. Later we learned that the dog wasn't rabid but had suffered brain damage at birth. This damage, and diseases that attack the central nervous system such as distemper, can produce some of the classic symptoms of rabies.

The dread that I felt when I thought I might be bitten is not unique. Rabies has been one of our most feared diseases since ancient times, and depictions of mad dogs in such books and films as Harper Lee's *To Kill A Mockingbird* and lately Stephen King's *Cujo* has done little to allay our anxieties. The fear that rabies inspires, however, is out of all proportion to the toll it takes. Rabies kills only a handful of people in the United States each year, and most of these contract it in third-world nations. Moreover, rabies is just one of a host of natural mortality factors that regularly ebb and flow through wildlife populations when numbers peak.

"Rabies can affect most warm-blooded animals, but is most common in carnivores because it is spread through a bite," said Dr. John Freeman, public health veterinarian for the N.C. Department of Human Resources. "Wildlife species which may suffer from rabies include foxes, raccoons, skunks and bats. Of course, dogs and cats can also contract the disease. In wildlife populations, rabies and other diseases are tied to population dynamics. When a wildlife population peaks in an area where rabies is endemic, or always present, an outbreak is liable to occur because increased contact between animals provides a greater opportunity for transmission of the disease. The outbreak may move through surrounding wildlife populations, especially if densities are high."

Rabies is not endemic to North Carolina except in bats, but since the turn of the century outbreaks of the disease have appeared in roughly 10- to 15-year cycles. The last large outbreak of rabies was in foxes in the 1960s, and the last rabid fox from this outbreak was discovered in Watauga County in 1970. A smaller rabies outbreak in skunks that was probably an extension of a similar problem in eastern Tennessee peaked in the northwestern portion of the state several years ago. Rabies outbreaks usually stay within a single species because species generally have little

Bats, like other wildlife species, can carry rabies, but few do. Bats are beneficial because of their ability to consume as many as 3,000 insects every night.



illustrated by David Williams

"Rabies is a natural mortality factor in wildlife populations, and when densities are high within a certain species an outbreak is liable to occur. In fact, rabies is not even a major mortality factor in wildlife in the Southeast. Simple starvation and diseases such as distemper take a far greater toll."

contact with animals other than their own kind.

An outbreak of rabies in raccoons, however, has recently spread to encompass most of the Southeast. Freeman says that the disease will probably appear here within a few years, and that while people should be aware of it, there is no cause for alarm.

The current rabies outbreak in raccoons originated in Florida and Georgia in the 1960s," said Freeman. "This outbreak has spread south to the Florida Keys, west to Mississippi, and north to include all of South Carolina. An outbreak of raccoon rabies in Virginia, the Washington, D.C. area, and portions of Maryland, West Virginia and Pennsylvania has been linked to the outbreak in the deep south. Examination of the virus has shown that this is probably part of the same outbreak, and most likely the disease was introduced to the mid-Atlantic states through the importation of raccoons from infected areas by hunting clubs. We haven't yet had any rabid raccoons show up in North Carolina, but with the disease facing us on two fronts it is only a matter of time."

There is no effective vaccine for rabies in wildlife, and for this reason the keeping of wildlife as pets is extremely hazardous. People bitten or scratched by wild animals in captivity have no assurance that the animal is not diseased. There is also little that can be done about a rabies outbreak in wildlife other than to let it run its course.

"Rabies is a natural mortality factor in wildlife populations, and when densities are high within certain species an outbreak is liable to occur," said Dr. Victor Nettles, leader of the diagnostic section of the Southeastern Cooperative Wildlife Disease Study at the University of Georgia. "In fact, rabies is not even a major mortality factor in wildlife in the Southeast. Simple starvation and diseases such as distemper take a far greater toll."

"We try to maintain wildlife species at moderate levels to ensure healthy populations," adds Hal Atkinson, chief of the Division of Wildlife Management of the N.C. Wildlife Resources Commission. "This reduces competition between animals, and lessens the potential spread of disease outbreaks."

It is the nature of rabies that evokes an almost primitive fear in man. Even the most hardened physicians who have spent years treating tropical diseases report that rabies resembles a scourge from medieval times, and is almost terrifying to treat let alone suffer. Yet, it is one of the rarest diseases in the Western world and the federal Center for Disease Control in Atlanta reports only two to three cases of human rabies in the United States annually. The unlucky few who contract the disease, however, face almost certain death. Worldwide, rabies kills about 20,000 people every year—mostly in undeveloped nations.

Rabies is a virus that is carried in the saliva of infected animals, and can be spread only through a bite. In the wound, depending on the severity of the bite and the concentration of virus in the saliva, the virus may enter damaged nerve cells in surrounding tissues. From this point, the virus moves through the nerve fibers to the spine—a process that is poorly understood and may take as little as several days or as long as a year. Then, the virus travels through the spine to the brain where it multiplies and causes severe inflammation of both the brain and spine. It is at this point that the first symptoms of rabies emerge.

Early symptoms of the disease, called "dumb" rabies, involve subtle changes in behavior. Humans may feel a vague sense of foreboding and suffer nightmares. Animals become skittish and fearful, and often seek darkness. At this point, however, the virus travels from the brain throughout the central nervous system—affecting virtually every major organ in the body. Occasionally, the disease will stay in its dumb form and the victim will quietly die, but it usually progresses to "furious" rabies—producing the classic "mad dog" symptoms in animals and "hydrophobia," or fear of water, in man.

The symptoms of furious rabies are bizarre and frightening. Pets that are normally gentle become vicious, and wild animals that are usually shy show no fear of man or larger animals and often become aggressive. Inflammation of the brain and spine and resulting paralysis causes animals to stagger, lower their heads and jaws, and drool saliva. Yet, even the savage attack of an animal as large as a rabid wolf is seldom immediately fatal because the animal lacks the sense of purpose needed to make a clean kill. In humans, one of the first symptoms of furious rabies is hydrophobia, or fear of water. The victim may appear to be fine, but because of the inflammation of the portion of the brain that controls the throat, he will be unable to swallow. As the disease progresses, the mere sight or mention of water will send the victim into spasms of terror, convulsions and delerium. In between these fits, the patient is often calm and perfectly rational. Death usually follows several days later of respiratory failure, although any of the internal organs may fail as the disease rages.

Man searched for a cure for rabies for thousands of years. The early Greeks recommended ducking the patient in a pool, but also prescribed immediate excision of tissue around the wound and cauterization with a hot iron. Ducking, of course, had little effect, but if the bite was not too severe the cleaning and cauterization of the wound was often effective.

Little progress was made in the treatment of rabies until 1881 when Louis Pasteur developed a vaccine, which was the first systematically developed vaccine for a human disease. Pasteur infected rabbits with rabies from dogs, and then developed a series of injections of rabies virus obtained from the spines of the rabbits at different stages of the disease. Through the course

of 23 injections, victims gradually built up a resistance to the disease. However, the procedure was expensive and painful, often requiring hospitalization for those receiving the treatment. With minor modifications, this procedure remained unchanged until 1980 when a team of French doctors developed a new vaccine similar in principle to the Pasteur treatment, but requiring only five injections and with fewer bad side effects.

"About 200 people receive the new treatment for rabies in North Carolina annually," said Freeman. "None of these have had any problems with the new vaccine. Of course, only two to three of these are confirmed cases of exposure to rabies. These are mostly bat bites—about one percent of the bats in the state carry rabies. In other cases we assess the risks before deciding on treatment. We consider the status of rabies in that species, behavior of the animal, where the bite occurred, and other factors. Wild animals generally aren't available for testing, and since rabies is almost always fatal, we err on the safe side and recommend treatment if there is any doubt."

Public health officials have found that the best defense against rabies is to reduce human exposure to the disease. Since little can be done about rabies in the wild, this effort focuses on the vaccination of pets and the collection of stray and unwanted dogs and cats that could serve as a reservoir for the disease.

People are bitten most often by pets, and tend to take these bites for granted," said Freeman. "If we can keep rabies out of the dog and cat populations, we eliminate most human exposure. In fact, this has already been done with dogs. Rabies vaccinations have been required for dogs since 1935, and the last rabid dog that showed up in the state was in 1969. Currently, cats pose a bigger threat. Although the last rabid cat in North Carolina was discovered in 1975, in 1983 in Virginia, South Carolina, and Georgia there were 15 cases of rabies in cats compared to only one in dogs. Rabies isn't showing up in our pets now because there is no reservoir of rabies in our wildlife populations. If raccoon rabies enters the state, the disease will begin turning up in pets as they come in contact with rabid animals, so it is important that all dogs and cats be vaccinated. In fact, a law requiring statewide rabies vaccinations for cats went into effect on July 1."

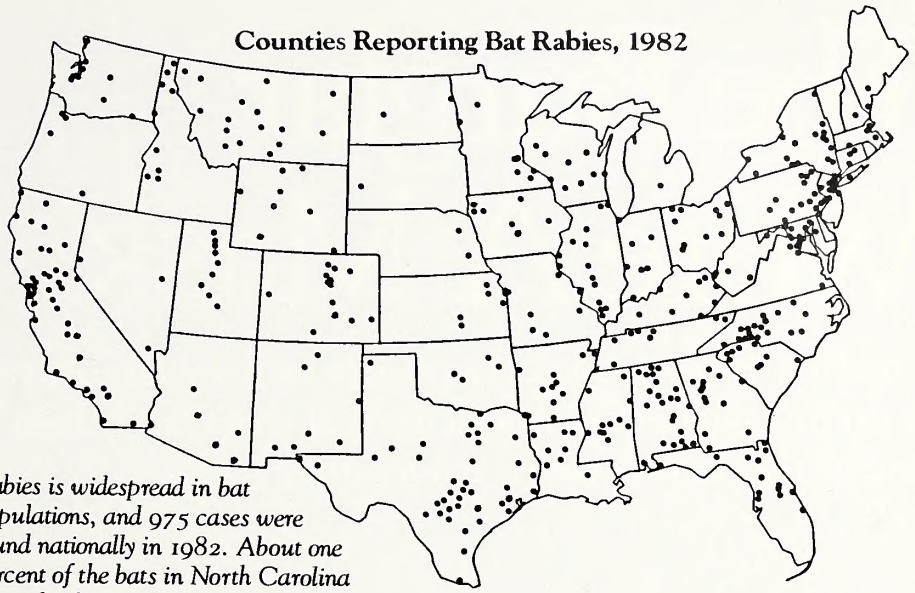
Freeman is especially concerned about the exposure of hunting dogs to rabies. A coon hound, for example, is a prime candidate for contracting the disease. He adds that it is a mistake for hunters to vaccinate their own dogs.

"Many hunters vaccinate their dogs for rabies, but these animals are not recognized as vaccinated under the law. There is good reason for this. Unless rabies vaccine is stored and administered properly, it is worthless. These dogs are the pets most likely to come in contact with a rabid animal, and if one of these dogs bites someone we have no choice but to recommend that the victim be treated for rabies—which is expensive and often painful. If the vaccine was administered by a veterinarian, however, we know that it was stored and administered properly."

Freeman concludes that the current outbreak of rabies which is on the brink of entering the state poses little threat to humans now. Because of the serious nature of the disease, however, people must exercise good judgment and common sense.

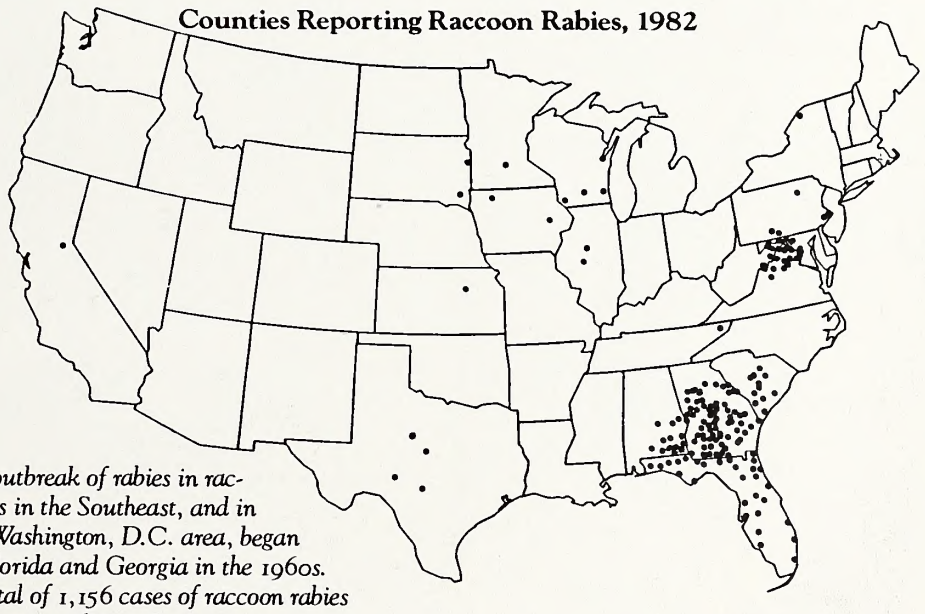
"The first step is to vaccinate your dogs and cats for rabies," he said. "Then, even if the disease is present in wildlife populations, there is little opportunity to contract it. The current outbreak of rabies in the mid-Atlantic States is especially serious because rabid raccoons are being found in urban areas—which offers greater opportunities for them to transmit the disease to pets, other raccoons, and to people who feed them. One of the main symptoms of rabies in wildlife is a loss of fear of man—so under all circumstances, these animals should be left alone." ⊠

Counties Reporting Bat Rabies, 1982



Rabies is widespread in bat populations, and 975 cases were found nationally in 1982. About one percent of the bats in North Carolina carry the disease.

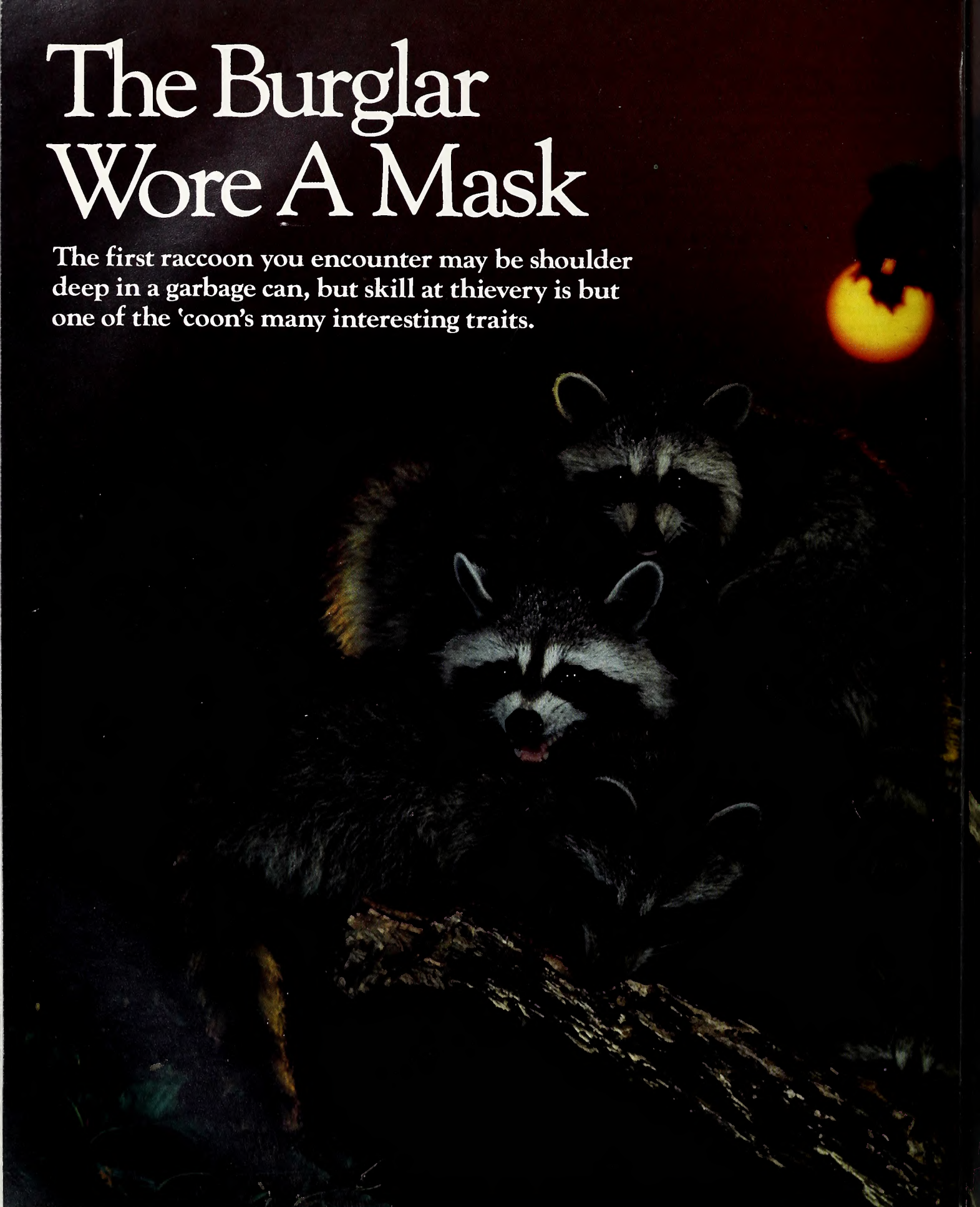
Counties Reporting Raccoon Rabies, 1982

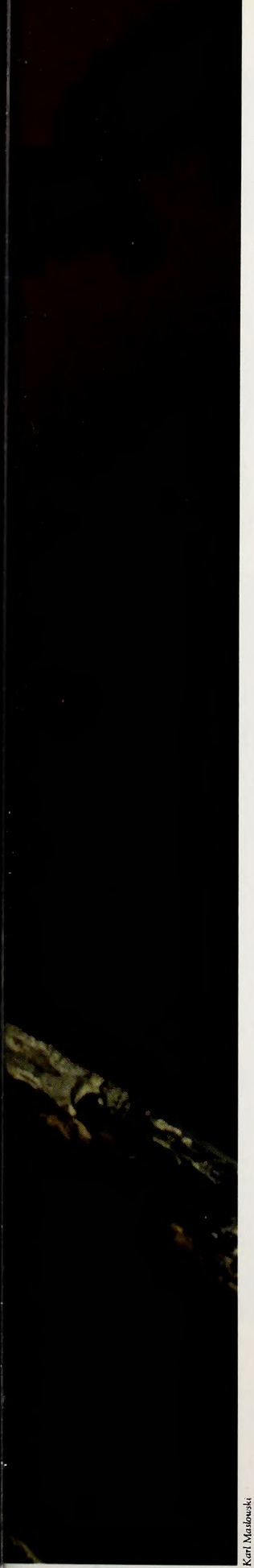


An outbreak of rabies in raccoons in the Southeast, and in the Washington, D.C. area, began in Florida and Georgia in the 1960s. A total of 1,156 cases of raccoon rabies were reported in 1982.

The Burglar Wore A Mask

The first raccoon you encounter may be shoulder deep in a garbage can, but skill at thievery is but one of the 'coon's many interesting traits.





Karl Maslowski

by Rick Estes

The first raccoon I ever saw was shoulder deep in Frank Swafford's garbage can. My parents and my brother and I were visiting the Swaffords at their cabin near Old Fort. I must have been eight or nine, and had decided it was time I stayed up all night with the older boys to see what I had been missing all those years.

My brother and Fuzzy Swafford were playing cards about 11 p.m. when we heard some scratching, then a tremendous crash out on the back porch. So far, things had been pretty boring, and I hoped the excitement was about to begin! The three of us jumped up and ran to look out the window. The porch light shone on the garbage can overturned on the floor, with a large raccoon right in the middle of it. I remember at first being both a little disappointed and a little relieved that it wasn't a bear or a burglar. Fuzzy had warned me that something was sure to get me if I didn't go to bed at a decent hour.

My disappointment soon changed to fascination as I watched the coon sample the smelly treasures he'd found. He picked up just about every can, bottle, and piece of paper in that garbage. Some of it he smelled, some he licked, and a few tasty morsels he ate forthwith, but he tested it first with his "hands." As long as I remained still he ignored me.

The curious facility with which a coon handles things with its forepaws is one of its best known behaviors. Descended along with bears from a primal dog, the raccoon has been given various names related to his paws. The Algonquin Indian name "arakunem" means "he scratches with his hands." The German name for raccoon, "Waschbar," means "wash bear," which accurately describes both its appearance and its apparent habit of washing its food. The coon's Latin name also refers to this curious behavior, but is not very appropriate. *Procyon*, the Latin genus name for raccoon, means "before the dog," but since coons descended from dogs more than 30 million years ago, this is not an accurate description of the relationship between dogs and coons. *Lotor*, the Latin species name, means "washer," but raccoons probably do not actually wash their food.

Now that I've really got your attention, let me explain. Much of a raccoon's food is caught or found in or near water. A coon searching for crayfish, frogs or other aquatic or amphibian prey will use its forepaws to feel for the food. He will touch and manipulate virtually everything with his paws. When he feels something that may be edible, and to a coon that can be just about anything, he turns it this way and that, dunks it several times, and may hold it to his nose for a good whiff before he begins eating it. This may look and sound like washing, but it probably isn't. The raccoon in Frank Swafford's garbage certainly didn't seem concerned that a piece of apple peeling wasn't clean; he just handled it and then ate it.

It has often been said that raccoons lack salivary glands, and therefore, must moisten all food before they can swallow it. Not true. Raccoons do have salivary glands. Besides, I know lots of cornfields far from water that would have been spared devastation by coons if everything they ate had to be dunked in water before they could eat it.

Procyon lotor, then is not a very apt name for the raccoon, but it will probably stick anyway.

A more accurate name for raccoons might be *Postcyon gluttonous* — they appeared later than dogs, and they'll eat just about anything. Raccoons are classed as carnivores, because they eat meat, and because they have the tooth structure typical of that group. However, they are omnivorous — with the accent on the "omni-." Snakes, grapes, baby turtles, beetle grubs, honeybees, fruit, crayfish — all are relished by these opportunistic feeders. They do not stalk as cats do, nor do they normally run down their prey like dogs. They simply find them and eat them. A raccoon feeding at the water's edge may stare off into the woods while he's handling everything in his path in the water. The effect is one of nonchalance, but the coon is probably just paying more attention to what he's touching than what he's hearing or seeing.

Since the nocturnal raccoons do most of their feeding at night, when vision is reduced, their

Leonard Lee Rue, III

A masked quartet gets ready for the night

Raccoons are nocturnal creatures generally, habitues of subdivision garbage pails as well as the deepest woods. A 'coon will eat just about anything within reach, and its omnivorous feeding habits sometimes cause it to run afoul of farmers (above).

sensitive forepaws play a vital role in locating, and perhaps, identifying food. An adult coon will cover up to a mile in an evening of exploring and feeding. His method seems based on the idea that there's lots of good stuff out there to eat, and if one checks out enough of it, he'll get his fill.

Raccoons do have efficient sight and hearing, however. Like most nocturnal animals, they have an extra set of light-gathering cells in their eyes. These act as mirrors, and reflect incoming light onto the retina a second time before it escapes through the eyeball. This nearly doubles the coon's night vision capability and causes its eyes to shine when lit by a hunter's or a car's lights. Their hearing is good, too, though not as acute as a rabbit's or a white-tailed deer's. While feeding or nesting, they seem to react more to certain sounds than to the level of sounds around them. A branch may break from a tree in a windstorm and cause little concern to a raccoon. But let a man step on a twig and break it, and the

Leonard Lee Rue, III

Eugene Hester

The Washing Bear

That's what the great naturalist Linnaeus called the raccoon in 1758. Only much later was it removed from the bear family. Does it wash its food? Probably not. Its sensitive forepaws feel the food whether it is under water or not.

coon becomes alert at once. Of course, this is true of many animals; they react to sounds — as well as odors and movement — that seem somehow out of place or unnatural.

Still, the raccoon's sense of touch is its most highly developed sense. The raccoon's feet are "plantigrade," which means that the whole bottom of the foot contacts the ground when it walks. This, and the fact that its soles are hairless, make its feet and toes very sensitive.

Now that is not to say that a coon is a shy, sensitive wimp of an animal. In fact, a raccoon is more than a match for just about any animal its size, and for some that are much bigger. It is a rare dog of any size that can handle an adult coon alone. There are several predators that prey upon young raccoons, however. These include the great horned owl, bobcats, fishers, cougars and wolves in areas where they still exist in appreciable numbers. Here in North Carolina, the major predators on coons are owls, bobcats, and man. The great horned owl is especially effective at taking young raccoons because they, too are nocturnal, and an owl can pluck a youngster off a limb before the mother can react.

Normally, raccoons mate once and raise one litter per year. Males will mate with as many females as possible, but females mate only once. When a female selects her mate, he may move into her den and stay with her for two or three weeks, but after mating he is unceremoniously evicted. Once the young arrive, he will not be tolerated near them.

Raccoon babies are born about 63 days after mating occurs. This puts most litters here in February and March. Litters average three-to-five young that are blind, covered with fine fur, and weigh around two ounces each. The mother is very protective and provides all their care with no help from her mate. After about 10 days, the young coons' facial masks and tail stripes appear; after three weeks their eyes open. The young do not leave the den for eight to 10 weeks. It is during the next several months, from spring through fall, that young coons are most susceptible to predation.

In autumn, raccoons eat more and build a layer of fat under their skins that will help them endure winter's cold. Raccoons do not hibernate, but they may stay in a den for days on end when the weather is very cold or windy. Their fatty layer provides insulation and energy during such times, and may make up nearly one-half an adult coon's body weight in winter.

An average raccoon weighs 12 to 16 pounds, stands about 12 inches high at the shoulders, and is about 30 inches long. The most distinctive features are the black mask across the face, and the black rings around the tail.

They are intelligent, curious and interesting animals, and many people think they are irresistibly cute, especially as babies. Don't let the big, black eyes and appealing faces fool you — these animals do not make good pets. Although a young coon may be fed from a bottle and climb up on your shoulder, they do not become domesticated. When a baby raccoon matures, it can make a shambles of a house and inflict serious injuries with its teeth and claws. It is not because a raccoon "turns mean" in captivity. When it reaches one or two years of age, it simply is a wild animal that needs to be wild.

William S. Lea

Head for the hills

A raccoon can get in some remarkably strange places, from the topmost branches of a tree to the eves of a chicken coop. In the latter case he's only scaring the chickens; he's really after their eggs. Thievery like this makes a lot of people mad, but watching the 'coon back awkwardly down the tree after the dogs have gone, and waddle away, it is difficult not to feel a certain kinship with an animal so determined to have its own way.

Raccoons have done better than many other species in adapting to man's growing population. This is primarily due to their varied diets and to their intelligence and adaptability. The biggest problem we cause for raccoons is cutting down den trees and stripping the land of suitable habitat. Ideal raccoon habitat varies somewhat from one part of the state to another, but it always includes some mature hardwood or mixed forest in close proximity to water. They need the large trees for food, den sites and escape from predators. The water also provides food. Raccoons feed in or near water whenever possible, and the water must be at least moderately clean to support the aquatic life coons feed on. A stream that is sufficiently polluted or choked with siltation cannot support crayfish or insect larvae, and becomes the weak link in the food chain that feeds fish, frogs and raccoons. A forest that has had its old, hollow trees removed to make room for straighter, faster-growing trees is less likely to house raccoons and many other species.

However, raccoons are adaptable. They will probably stick it out with us. Their ability to survive is a lot like their name, *Procyon lotor*: it may not be a perfect fit, but somehow they will make it work. ⊠

Still Time To Comment On 50-Year Forest Service Plan

Logging, Mining To Increase Drastically In National Forests

Written and Edited by Mark Taylor

If you'd like to have a say in how our national forests are managed for the next 50 years, now is the time to speak up. The U.S. Forest Service has published proposed 50-year management plans for all national forests, and is seeking public comment. Included in these plans are the Resources Planning Act "target uses" for national forests. Here are some highlights of these projected uses of our forests in 50 years:

- On the Nantahala and Pisgah national forests, the annual timber harvest would be increased from the current 61 million board feet to 219 million board feet. Funding for fire protection would decrease from a current $1,275 to $1,255 per thousand acres, and there would be no increase in construction of fire breaks and fuel reduction. Mineral leasing would increase by a third—from 65 to 93 permits. Construction and reconstruction of small, local roads would increase from 101 to 115 miles annually, and larger "arterial and collector" roads would jump from 4 to 10 miles annually. Recreational use would more than double.

- On the Croatan and Uwharrie national forests, the annual timber harvest would be increased from 14 to 20 million board feet annually. Funds for fire control would decrease from the current $1,275 to $1,225 per thousand acres, and a slight reduction would be made in construction of fire breaks and in fuel reduction treatments. Mineral leasing would almost double—from 10 to 17 permits—and road construction and reconstruction would be maintained at current levels. Recreational use of all types would double.

"The RPA target uses are among the alternatives presented in these plans," said Bob Cunningham, staff planning officer for the U.S. Forest Service in North Carolina. "We encourage people to review and comment on these alternatives."

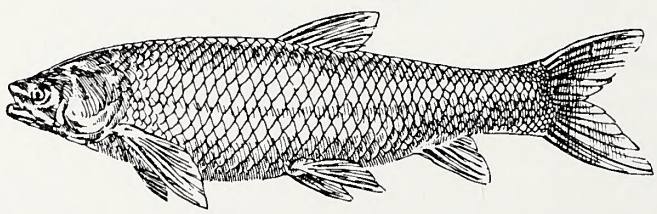
Conservationists are concerned about these target uses. "Wildlife species that need mature forest—such as black bears, wild turkeys, and endangered red-cockaded woodpeckers, which are found predominantly on national forests—would suffer from this timber cutting," said Derb Carter, director of the Southeastern field office of the National Wildlife Federation in Raleigh. "Increased timber harvest would reduce cutting rotations, and eliminate the old-growth forest needed by these species. Increased road construction and mining also disturbs wilderness-type wildlife species, adversely affects recreation, and leads to increased siltation."

The draft plan for the Nantahala and Pisgah national forests is now available, and the plan for the Croatan and Uwharrie national forests will be available in early March. The Forest Service will accept comments on these plans for 90 days after their release. Copies are available from the U.S. Forest Service, P.O. Box 2750, Asheville, N.C. 28802.

Sterile Grass Carp May Control Hydrilla

There may be a solution to the problems posed by hydrilla and other nuisance aquatic weeds which threaten our waters. The N.C. Wildlife Resources Commission recently authorized the use of a sterile strain of grass carp on a permit-only basis to control aquatic weeds. These fish reach weights of 70 pounds, and can eat two to three times their own weight in aquatic vegetation daily.

"Hydrilla is a preferred food of the sterile grass carp, and the fish offer great potential as an effective control," said Fred Harris, assistant chief of the Division of Inland Fisheries of the N.C. Wildlife Resources Commission. "The fish may also be used to control elodea, pond weeds and other aquatic weeds."



The use of grass carp has been controversial since the fish were first introduced to this country from Asia to control weeds in the Mississippi River drainage. Biologists did not think that grass carp would be able to reproduce and establish new populations in this country. They were wrong. Grass carp are now found throughout the southern Mississippi drainage, and are extending their range. Proponents of the fish cite their effectiveness in controlling weeds. Critics charge that grass carp harm native fish and waterfowl by doing their job too well—effectively destroying all aquatic vegetation that offers habitat to native fishes and waterfowl.

"The development of the sterile grass carp eliminates many of the problems associated with the use of non-sterile fish," said Harris. "These genetically sterile fish are not able to reproduce, so new populations would not become established in North Carolina. Part of the permit process would require that fish be tested for sterility before being released. The permit would also stipulate that fish be stocked only in the numbers needed to achieve control of aquatic weeds."

The numbers of grass carp needed to control weed problems are relatively low. Most problems can be controlled by stocking 15 to 20 fish per acre. The fish are normally stocked at lengths of 8-9 inches in the spring, and will effectively control weeds by the end of the summer. However, the fish are not cheap. These sterile fish cost $3 to $4 apiece—excluding shipping, inspection for sterility, and other costs.

The strain of grass carp authorized for use in North Carolina is genetically sterile. Normal fish have two sets of chromosomes while sterile grass carp have three sets. This "triploid" strain is achieved by "heat-shocking" the eggs of normal fish at an early age.

Tips Help Shooting

Federal Refuges Require Steel Shot

Waterfowl hunters who plan to hunt at national wildlife refuges in North Carolina will need to use steel shot again this year. Those familiar with the differences between lead and steel shot have also found that they will need to alter their shooting tactics.

During the upcoming seasons, steel shot will be required in all gauges on the Lake Mattamuskeet, Swanquarter, and Cedar Island national wildlife refuges, and steel shot (in 12 gauge only) is required on recreation areas open to hunting on the Cape Hatteras National Seashore.

Much controversy has surrounded the use of steel shot, but there is no doubt that the ballistics of steel versus lead shot are different. Changes in shot size, barrel chokes, and shooting techniques are needed to use steel shot effectively.

First, hunters need to use a larger shot size in steel because it has a lower density than lead. The best all-around choice for waterfowl hunters is No. 2 steel shot. For smaller ducks, such as teal, No. 4 steel shot may be effective. Goose hunters should not use steel shot smaller than No. 1, and BB in steel is preferred.

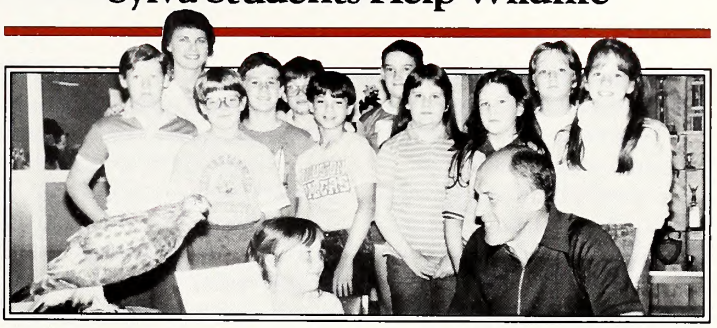
Steel shot also shoots a shorter, denser pattern than lead shot because it is harder than lead and doesn't become deformed by the gun barrel. Hunters may compensate for this by using a different choke to open up the shot pattern. An improved cylinder is the best choice, and a modified is the tightest choke that should be used.

Ballistics studies have shown that steel shot travels about 100 feet per second faster than lead so hunters may need to adjust their leads. Hunters should avoid shooting at ducks over 40 yards with lead or steel shot because of the increase in the number of cripples.

Finally, steel shot should not be used in old, expensive double-barrelled shotguns because it may damage the barrels. Steel shot should also not be reloaded in shells made for lead shot—special components are needed for reloading steel. And, of course, substitutes for steel shot—such as BBs or ball bearings—should never be used in any shotgun.

Class Sponsors Projects

Sylva Students Help Wildlife



Sylva Herald / Angela Griffin

Building A Better World: *A fifth grade class at the Fairview Elementary School in Sylva recently donated $37 to the North Carolina Nongame and Endangered Wildlife Fund. In return, Dan Robinson, Wildlife Commissioner for District 9, presented the class with a certificate of appreciation from the Wildlife Commission.*

A fifth grade class of academically gifted students at the Fairview Elementary School in Sylva recently got a lesson in civics through the study of endangered wildlife.

"I felt that it was important for the students to attack a problem that was real—to get into something that involved the whole country and the whole world," said Pat Berne, their teacher. "The issue of endangered species offered the opportunity for that kind of involvement."

First, the students received an introductory class on endangered species taught by a Wildlife Commission education specialist. Then, the students decided how they wanted to get involved.

The students began by undertaking several projects to raise funds for endangered species programs. These included a bake sale, raffle of a bike, and a flea market. In addition, the class also learned about the status of endangered species, why some animals are becoming endangered, and what can be done to protect endangered species. Finally, the students got involved in the politics of the issue. Letters and petitions were sent to Senators Helms and East and Representative Clarke urging them to support federal endangered species projects.

"The kids really learned a lot from this project," said Berne. "It's an important issue, and they enjoyed working on it."

The students' fund raising projects raised over $130, and this was donated to the Animal Welfare Institute, National Wildlife Federation, and the N.C. Wildlife Resources Commission's Nongame and Endangered Wildlife Fund.

Teachers who are interested in learning more about how to incorporate wildlife in the classroom should contact the Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

—Jay Davies

It's A Lifesaver

Boating Kill-Switch A Good Investment

Many boating injuries and deaths could be avoided by the installation of a $15 switch. If you use your boat alone or in cold weather, a safety kill-switch for the engine could save your life.

The principle is simple. The kill-switch is placed on the electric wire running from the ignition to the boat's engine. Attached to the switch is a plug that can be hooked to the clothing of the boat operator by a short string. If the operator gets farther away from the steering wheel than the length of the string, the plug is pulled from the kill switch. This interruption of electricity immediately stops the engine.

Quick stopping of the engine can save the operator who has fallen overboard from being struck by a whirling propeller. It also allows the person to swim back to the stopped boat, which is especially critical in cold weather. Safety kill-switches are easy to install, can be adapted for use with small, hand-steered outboards, and are available from most marinas.

—Terry Shankle

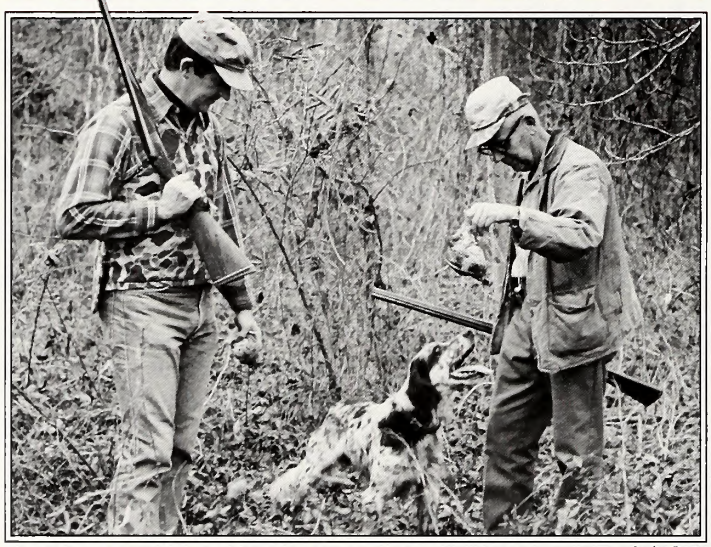
Daniel Boone Camp One Of Best

N.C. Boy Scouts Honored For Conservation Program

North Carolina's Daniel Boone Council of the Boy Scouts of America was recently honored by the U.S. Department of Agriculture for its outstanding conservation program. The Daniel Boone Council, centered in Asheville and covering the western portion of the state, was one of 16 Boy Scout councils in the nation to receive a Green Seal award for its programs.

"Our conservation program centers around the Daniel Boone Scout Camp in Haywood County," said Joe Glasscock, Scout executive for the council. "Activities at the camp focus on forestry and tree farming, soil erosion and conservation, fisheries and wildlife management, and environmental science. We have a comprehensive merit badge program in these areas, and last summer almost 200 kids received merit badges in conservation fields. In addition, the council maintains a year-round conservation program. Last year, for example, as part of 'Clean Streams Week' scout troops participated in litter cleanups and other projects on the French Broad River."

Did Wet Weather Hurt Quail?



Luther Partin

That Time Of Year: *Quail and rabbit season both open on Saturday, November 17. Extremely wet weather last summer was hard on quail, but has probably helped rabbit populations.*

Last summer's heavy rains were a mixed blessing for small-game hunters. Quail populations are down, but rabbits should be up.

"Extremely rainy, wet summer weather usually hurts quail populations," said Grady Barnes, section manager for research and regulations for the Division of Wildlife Management of the N.C. Wildlife Resources Commission. "Many of the young chicks that hatch during this period die of exposure. However, this weather has little effect on rabbits because the young are well-protected by a nest. In fact, the rain may benefit rabbit populations by promoting thick growth of cover in summer which increases the survival of young."

Both the rabbit and quail seasons open Saturday, November 17 and run through February 28. The bag limit for quail is 10 birds daily with 20 in possession. The bag limits for rabbits is 5 daily with 10 in possession.

"First Of State" Stamps Offered

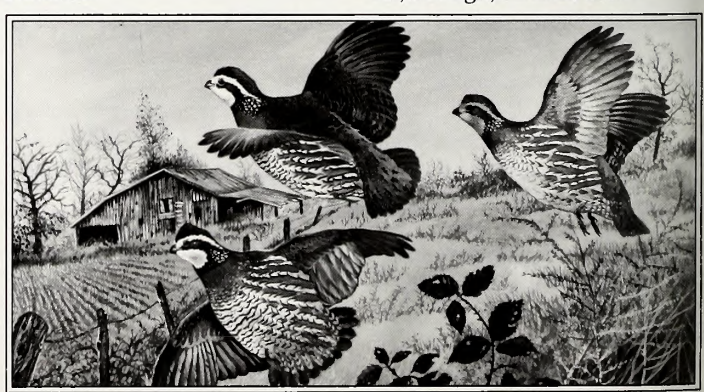
North Carolina's "First of State" Hunting and Fishing License stamps are now on sale, and sportsmen can get a complete set certain to be collectible in future years.

These stamps—33 in total—are affixed to the passbook-format license, which was instituted for the 1983-84 hunting and fishing seasons. A complete set of "First of State" Hunting and Fishing License stamps includes the colorful resident and nonresident sportsman's license stamps, which feature a painting of a covey of quail by well-known North Carolina wildlife artist Duane Raver, and 32 other stamps. Incomplete sets of the stamps (only the one-day fishing stamp is missing) and individual resident and nonresident sportsman's stamps are also available.

These stamps will be available through December 31 or until the supply is exhausted. Remaining unsold stamps will be destroyed after December 31 to assure the value of the stamps to collectors. The North Carolina State Waterfowl Stamp is not included in the packages above.

"Stamp collectors and wildlife memorabilia buffs should enjoy a set of these stamps," said Sid Baynes, chief of the Division of Conservation Education of the N.C. Wildlife Resources Commission. "They're not only a good investment, but also benefit wildlife."

Information and order forms are available from the N.C. Wildlife Resources Commission, First Of State Hunting and Fishing Stamps, 512 N. Salisbury St., Raleigh, N.C. 27611.



Ken Taylor

A Golden Opportunity: *Outdoorsmen and stamp collectors now have the opportunity to obtain North Carolina's "First Of State" Hunting and Fishing License stamps, including the colorful 1983-84 sportsman's stamp which features this painting of a rising covey of quail by well-known wildlife artist Duane Raver.*

One Duck Permitted Daily

Black Duck Season Opens Late

Is it a black duck or a hen mallard? If you're not sure, don't shoot. The regular duck season will run from November 22-24, and from December 7 through January 19. However, in an effort to halt a decline in the black duck population, the season for this species will open later—from December 27 through January 19—and hunters will be allowed to take only one black duck daily.

"The shorter season and reduced bag limit is part of a three-year effort to reduce the harvest of black ducks by 25 percent throughout the Atlantic Flyway," said Grady Barnes, section manager for research and regulations for the Division of Wildlife Management of the N.C. Wildlife Resources Commission. "Last year, in the first year of this program, the flyway harvest of black ducks was reduced by 37 percent over the average annual harvest for the previous five years. In North Carolina, the harvest was reduced by 31 percent over the previous season. At the end of the three-year program, these changes in regulations will be evaluated. We also commend hunters throughout the Flyway for adhering to the new regulations, and helping us achieve the reduction."

Biologists are concerned about a steady decline in the black duck that has seen the population in the United States and Canada drop from five million to less than two million birds in the past three decades. The factors that are affecting black ducks are complex and not fully understood. However, biologists feel that acid rain, hybridization of black ducks with mallards, and heavy hunting pressure have all played a part.

Acid rain may be hurting black duck numbers by lowering the productivity of marshes in Canada and the Northeast—which is the prime breeding habitat for the species. Also, black ducks are traditionally a bird of the coastal marshes and forested swamps while mallards inhabited the prairie. As forests were cleared for agriculture and development, mallards have extended their range and the species have readily hybridized. Finally, the black duck is the leading bird in the waterfowl harvest in most northeastern states, and usually ranks fourth or fifth in North Carolina. By reducing the harvest of young black ducks—especially breeding age females—biologists hope to stabilize the population.

"We hope that this reduction of the black duck harvest in the Atlantic Flyway will halt their continued decline," said Barnes. "Problems with hybridization and acid rain will continue, but hunting is the only factor over which we have any control. If the decline continues at the current rate, further cutbacks in hunting seasons and bag limits may be necessary in the future."

Barnes says that one problem is that it is easy to confuse a hen mallard with a black duck, and offers the following tips for differentiating between the two:

- The black duck is uniformly dark. The only noticeable white on its body is on the underside of its wings, which contrast sharply with its darker body.
- The belly of the hen mallard is light colored while the belly of the black duck is dark.
- The hen mallard has distinctive white borders along the upper and lower edges of the blue patches (speculums) on its wings.

Still Time To Order

Great Christmas Gifts

The perfect Christmas gift? For an outdoorsman, a lifetime hunting and fishing license or lifetime subscription to *Wildlife In North Carolina* are about the best things that could be found under the tree.

These lifetime licenses and lifetime subscriptions to *Wildlife In North Carolina* are not only great investments, but help wildlife. Funds from their sale are placed in the North Carolina Wildlife Endowment Fund, and only the annual interest from this fund is used for wildlife conservation programs. In the future, this fund will play a key role in supporting wildlife programs.

Several different categories of lifetime licenses are available. Lifetime sportsman's licenses are available to residents and non-residents and include all hunting privileges, all hook-and-line fishing privileges, and bow-fishing privileges. Trapping and special-device fishing licenses are not included in lifetime sportsman's licenses, however.

Lifetime hunting and lifetime fishing licenses are available to residents only. These licenses include only basic hunting and basic fishing privileges. Special-use licenses—such as big-game tags for hunting or trout licenses for fishing—must still be purchased annually.

Information and applications for lifetime licenses are available from license agents, Wildlife Commission employees, or the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611. Applications for these lifetime licenses and lifetime magazine subscriptions can also be found on the insert in this magazine.

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$600,000 Raised From Stamps And Prints

State Duck Stamp Sales Help Waterfowl In North Carolina

North Carolina's second state waterfowl stamp features a painting of two wood ducks by well-known wildlife artist Jim Killen of Minnesota, and like the first stamp last year, it is expected to become highly collectible. Killen was Ducks Unlimited Artist of the Year in 1983, and has won many other honors.

Waterfowl stamps may be purchased from license agents or directly from the License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27611. Single stamps sell for $5.50, and a numbered corner block of 4 stamps sells for $22.

Sheets number 1 through 10 will be reserved for sale in entire sheets by a sealed bid auction with the highest bidder receiving sheet number 1 and the next nine sheets being awarded in descending order to the next nine highest bidders. A full sheet of 30 stamps sells for $165. Sheets number 11 through 160 will be reserved for sale in entire sheets only, and sheets number 161 through 334 will be used for plate block sales.

The minimum bid is $165, and all bids must be received by December 31, 1985. With the exception of sheets number 1-10, those purchasing sheets and plate blocks from the first 334 sheets automatically reserve the right to purchase the same numbered items the following year.

Stamps remaining unsold after December 31, 1985, will be destroyed by the N.C. Wildlife Resources Commission, thus assuring lasting value for collector's and dealer's stamps.

Ken Taylor

Keep 'Em Flying: *The 1984 North Carolina State Waterfowl stamp, which features a painting of these wood ducks by Jim Killen, provides a big boost to waterfowl conservation in North Carolina. Last year the stamp and print program raised approximately $600,000 for waterfowl conservation and management in the state. Hunters and stamp collectors may obtain stamps from license agents or from the Wildlife Commission headquarters in Raleigh. Prints are available from art dealers.*

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on July 31, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	8,893	$2,656,149.42
Lifetime Hunting License	92	16,529.43
Lifetime Fishing License	498	82,810.28
Lifetime Subscriptions to Wildlife in N.C.	307	35,042.13
Contributions	—	39,971.67
	Fund Total:	$2,830,502.93

Calendar Of Events

November 3
Mill Creek Oyster Festival at Mill Creek. Includes parade, food, crafts and entertainment. For more information contact Festival Chairman, Rt. 2, Box 84, Newport, N.C. 28570.

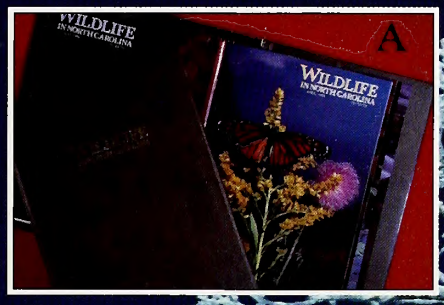
November 3-4
4th annual Bentonville Battleground Living History and Tactical Demonstration at the Bentonville Battleground State Historic Site in Newton Grove. Features living history encampment, demonstrations of equipment and weapons, battlefield representations, and other events. For more information contact the Bentonville Battleground Historic Site, P.O. Box 27, Newton Grove, N.C. 28366.

November 9-15
Southern Flue-Cured Tobacco Festival at Greenville. Features crafts, clogging, antique car show, and other events. For more information contact M. Kay Warren, P.O. Box 7366, Greenville, N.C. 27834.

November 11-12
Roanoke Arts and Crafts Guild Fair at Williamston High School in Williamston.

November 18
A Pioneer Thanksgiving at the Schiele Museum of Natural History in Gastonia. Features exhibits and demonstrations of blacksmithing, colonial cooking, weaving and other early arts. For more information contact the Schiele Museum, Box 953, Gastonia, N.C. 28053.

Gifts from WILDLIFE



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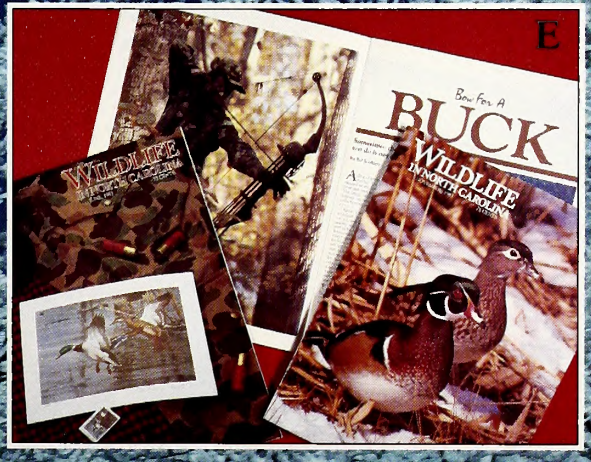

Winter Visitors

These canvasback ducks traveled a long way to reach the coastal waters of North Carolina, but those bright red eyes aren't from jet-lag.

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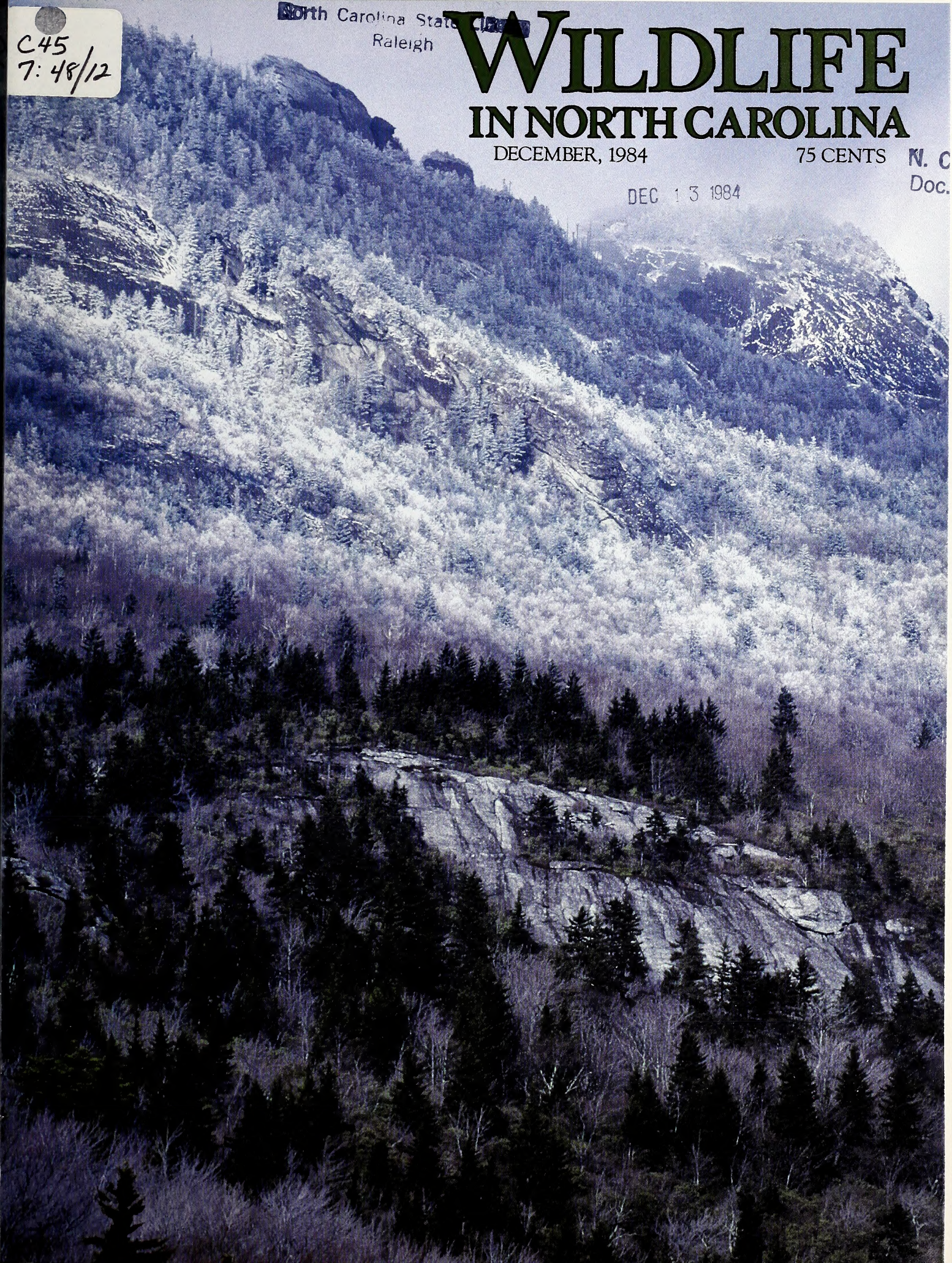

The Expendable Bobwhite

by Jim Dean

If, by some quirk of fate, bobwhite quail in this hemisphere were suddenly wiped out by disease or some other disaster, I suspect there are a few bird hunters who would continue to feed and train bird dogs and hunt their favorite fields and covers until their souls were finally gathered to that great pea field in the sky.

An odd thought—a hunter with no quarry? Perhaps not. Most bird hunters would tell you the traditions of the sport are more compelling than the kill. Of course, every quail hunter would be heartsick if he thought his beloved "buds" were actually endangered. Indeed, if a referendum were held, he'd vote to plow under the Research Triangle and every major city in the state and replant with soybeans and wildlife food patches (where are the true statesmen when we need them?).

Leonard Lee Rue, III

Getting back to the subject, many quail hunters would readily admit that the most expendable part of their sport might be the bird itself. I was again reminded of this just before Christmas last year on a hunt that took place near Wilmington. Despite the fact that bobwhites made barely a cameo appearance, it was probably the most pleasant hunt of the season. I'm not sure I can even tell you why.

Part of it had to do with the flat fields cut with hedgerows and ditches—classic quail country. The bordering woods were mostly mature longleaf pine with a low understory of gallberry, catbrier and switch cane. We found many quail roosts in the grass. We also hunted with the knowledge that on a memorable day a year previously, the dog we followed had found 11 coveys in these fields.

We didn't expect that sort of action this time around because the temperature rose to 80 degrees by mid-afternoon, forcing us to take a breather for a cold soda in a country store. Yet, just before dusk, the pointer found one covey that flushed wild into the pines. After that, we called it quits and spent the evening eating a bushel of oysters.

I'll admit it doesn't sound very exciting. I guess you had to be there. Still, while we were hunting, I realized what it is about quail hunting that is so appealing. Even when the birds are playing hard to get, the sport has a wonderful, timeless familiarity. To put it another way, the quail hunter doesn't need—or want—to own the newest gun each year, and he doesn't have to read a bunch of articles to learn the latest tactics. We were carrying guns owned by our grandfathers, wearing clothes we've had for decades and walking in fields that have been feeding crops of bobwhites since they were cleared in colonial times. As hunters, we had been as carefully line-bred as the dog that bounced through the straw ahead of us. For us, it could as easily have been 1884 as 1984, and that is a feeling I have come to appreciate.

I think this may also explain why there are so few quail hunting articles in national outdoor magazines. What can you write about a sport that has steadfastly resisted change since the days of Nash Buckingham? And in a pursuit so marvelously hide-bound, what possible difference could it make that we didn't bring home a limit of birds? I don't suppose anyone but a fellow quail hunter could understand although Grantland Rice was getting pretty close when he wrote, "It isn't whether you win or lose, but how you play the game."

There is, however, a darker side that deserves mention. We in North Carolina have been fortunate that there is still a lot of good quail habitat. For the sportsman who bothers to look, it's still possible to find good places and landowners who are glad to let you hunt. That's no longer true everywhere in the nation, and even here, the situation has been undergoing an increasingly rapid change, especially since the 1950s. Farming practices have changed, small farms have been gobbled up by larger farms, urban sprawl has spread rapidly and more and more land has been posted. There's not a quail hunter alive who can't point to a parking lot or housing development sitting on what was once prime bird cover.

I could tell you that we ought to resist unwise development and set aside some areas for the future, but you know that. I could also suggest that we take special care not to abuse our privileges to hunt on private land, but I suspect the people who need to learn that lesson aren't reading this. In short, the problems are apparent, but the solutions are not.

Indeed, it's this uncertainty about the future of quail hunting that makes it so special today. For the present, at least, we can still put one foot in the last century and bask in our hunting traditions, but we do so with vague apprehension. Perhaps, for me, this uneasiness is merely the year-end blues—a sudden taste of mortality—but a bird hunt has always been like a visit with an old and dear friend. One can't help but wonder how much longer either can last.

December, 1984
Volume 48, Number 12

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and Community Development

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WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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The old man had shot countless ducks during his market hunting days—too many, we would say today. And yet, he was a link to the past and there was magic in his memories.

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Dying spruce and fir trees on the East Coast's tallest peak may prove to be a warning of serious pollution problems. Here's what we know—and don't know—about the causes.

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It may be nature's most dazzling display, and yet little was known until this century about how snow is formed.

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When the big chopper bluefish hit our coast 15 years ago, they jazzed up the fishing, but what are the chances they'll stay?

DEPARTMENTS

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Back Of The Book *by Mark Taylor*

Front Cover *A snow-covered mountainside is a handsome symbol of the season, and you can learn how snow is formed by reading the article on page 18 of this issue. Photograph by Ken Taylor.*

Back Cover *Five whistling swans wing past a hazy, full winter moon in this unusual photograph by Ken Taylor.*

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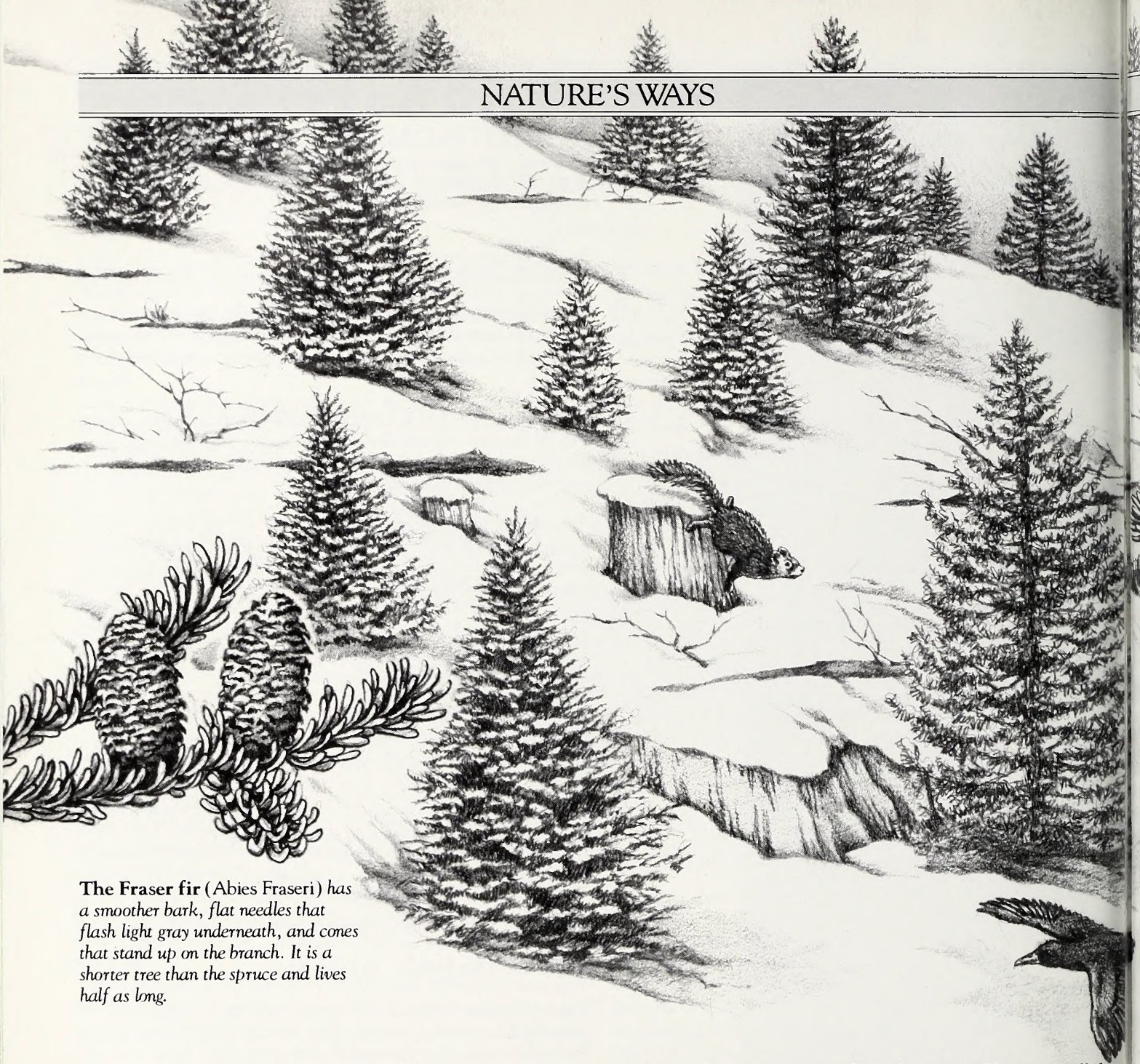


The Fraser fir (Abies Fraseri) *has a smoother bark, flat needles that flash light gray underneath, and cones that stand up on the branch. It is a shorter tree than the spruce and lives half as long.*

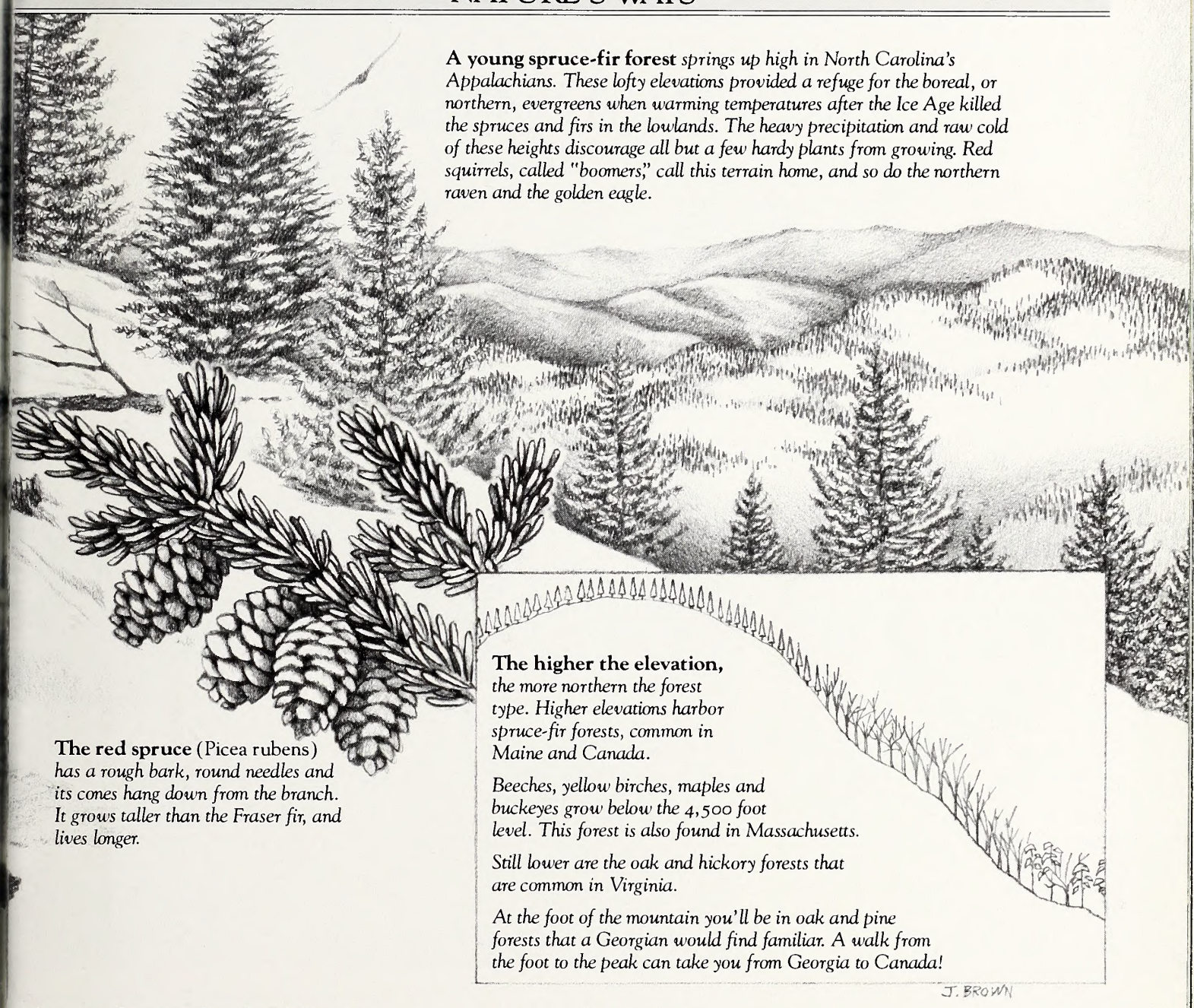
Christmas Tree Land

written by Lawrence S. Earley / illustrated by Jim Brown

High in the mountains of North Carolina are the forests of red spruce (*Picea rubens*) and Fraser fir (*Abies Fraseri*), conifers that carry the scent of Christmas in their fragrant boughs. "Christmas Tree Land" is what ecologist Bertram Wells once called the high-elevation province of the spruce-fir forests, and the name fits.

During the Ice Age the cold climate provided a favorable environment for these hardy evergreens well into the Piedmont, but when the temperatures began to warm the trees were forced higher into the mountains where they are found today. A walk through these forests is like going back in time to the era when coniferous forests once covered North America. You can smell the evergreens at about 4,500 feet, where the hardwood forest begins to yield to red spruce. At 5,500 feet spruce and fir are mixed evenly, while above 6,000 feet the forest is dominated by Fraser fir.

You'd have to go to Maine or Canada to find a winter climate as harsh as the one that exists on these high Appalachian peaks. Temperatures regularly explore the minus scales in this terrain— in January 1966 the lowest temperature ever recorded in North Carolina was taken on Mt. Mitchell: -29°F. One hundred inches of snow in a season is common on some peaks, and when it is not snowing it is frequently raining. Spruce-fir forests can get drenched with 80 inches of precipitation in a year, not including another 40 to 60 inches of moisture from the saturated clouds that bathe the trees many days each year. Violent winds sometimes level an entire row of trees like a line of dominoes— an effect called "windthrow." The trees' roots cannot burrow deeply into the shallow, rocky soil. Instead they intertwine with the roots of



A young spruce-fir forest *springs up high in North Carolina's Appalachians. These lofty elevations provided a refuge for the boreal, or northern, evergreens when warming temperatures after the Ice Age killed the spruces and firs in the lowlands. The heavy precipitation and raw cold of these heights discourage all but a few hardy plants from growing. Red squirrels, called "boomers," call this terrain home, and so do the northern raven and the golden eagle.*

The red spruce (Picea rubens) *has a rough bark, round needles and its cones hang down from the branch. It grows taller than the Fraser fir, and lives longer.*

The higher the elevation, *the more northern the forest type. Higher elevations harbor spruce-fir forests, common in Maine and Canada.*

Beeches, yellow birches, maples and buckeyes grow below the 4,500 foot level. This forest is also found in Massachusetts.

Still lower are the oak and hickory forests that are common in Virginia.

At the foot of the mountain you'll be in oak and pine forests that a Georgian would find familiar. A walk from the foot to the peak can take you from Georgia to Canada!

J. BROWN

other trees, forming a dense but shallow mat.

Certain fats in the cells of the needles of both trees reduce their freezing points, enabling them to survive extreme cold. And their wax coating, like that of other coniferous species, contain few stomata, preventing the loss of precious water in winter. Through these adaptations, spruce and fir have survived in their lonely and beautiful surroundings.

Few other things can grow in such a moist and cold environment. Amid the spruces and firs on Mt. Mitchell, for example, only mountain ash, yellow birch and fire cherry share the canopy, and then only at lower elevations. And only a few hardy shrubs, mosses and ferns can survive in the understory, including the mountain wood sorrel (*Oxalis acetosella*), bluets (*Houstonia caerulea*), the Southern lady fern (*Athyrium asplenioides*) and the sharp-leaved aster (*Aster acuminatus*). Among wildlife, snakes generally avoid the highest elevations, although salamanders revel in the wet soil and undergrowth. The red squirrel makes its home here and so does the northern raven.

Red spruce tends to grow older and larger than Fraser fir. A spruce with gray hair may be nearly 300 years old, growing 120 feet tall with a trunk that can measure 30 to 40 inches in diameter under favorable growing conditions. At 80 years a fir is ancient and one that is taller than 80 feet is rare.

The two trees are easy to distinguish. The Fraser fir has smooth bark, flat needles and cones that stand up on the branch. Red spruce's bark is rougher, its needles round and its smaller cones hang down from the branch.

The spruce-fir forests of the southern Appalachians once covered over one million acres, but loggers decimated this forest. Today only about 18,000 acres remain and scientists suspect that pollution is killing many of these spruces and firs (See "Trouble On Mt. Mitchell," pp. 11-17). It is surely ironic that these spruce-fir forests could survive thousands of years of Ice Age cold, but against 100 years of man-made pollution they may well be helpless. ⊠

Something For The Ducks

Ducks and geese will be getting more help in North Carolina as part of this new waterfowl plan paid for by the voluntary stamp and print program.

by Dennis Luszcz

Have you ever had to spend someone else's money? It's an uncomfortable feeling. Perhaps a friend handed you a twenty and asked you to pick up a spinning rod on sale at a discount store. "If it looks good buy it," he says. Or perhaps you are the treasurer of your deer hunting club and have to decide what color to paint the club house. If you're like me, you put far more thought into making a purchase for another than you do for yourself.

The outstanding response of thousands of dedicated North Carolina waterfowlers to the first year of the voluntary North Carolina Waterfowl Stamp and Print Program has placed the Wildlife Resources Commission in just such a position. The state's duck hunters have shown through their support of the program that they are strongly committed to protect the waterfowl resource and improve its management here in North Carolina. Funds generated by the stamp-print program were entrusted to the agency to be spent in the best possible manner to achieve these ends.

The $600,000 raised from the sale of stamps and prints in 1983 represents a windfall to the waterfowl program. Already, numerous suggestions for spending the money have come from sportsmen across the state. Some of these ideas are sound and some are not. Some would represent permanent benefit to the resource and its users, while others are limited or not cost effective.

Recognizing the danger of a poorly planned program, the Wildlife Resources Commission directed its waterfowl biologists to take these suggestions, along with ideas of their own, and develop a comprehensive waterfowl-management plan. The purpose of the plan would be to identify problems facing the waterfowl resource in North Carolina and recommend effective strategies to deal with them. An important part of this exercise was to analyze existing waterfowl programs and policies and determine how they should be modified or improved.

A good waterfowl management plan furnishes the agency with long-range goals and assures continuity of the program as personnel or administrative changes occur. Radical reversals in policy, based on short-term pressures are usually counter-productive and would be less likely to occur with a well thought out plan already enacted. The plan was intended to be flexible, however, and can be modified to consider significant future changes in the waterfowl situation.

The first draft of the waterfowl-management plan was prepared in 1982 by the

Ken Taylor

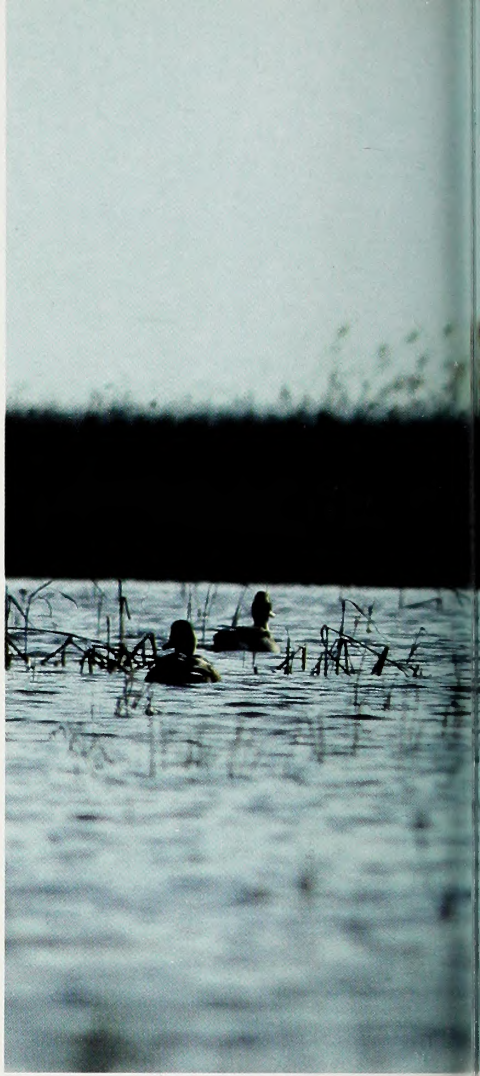
Without help from sportsmen and waterfowl aficionados, the future of ducks like these pintails (above) may be in doubt, but North Carolina's new long-term waterfowl management plan is expected to play a role here. Eventually, there will be more places where a visiting bluewing teal hen (right) can rest and feed. Improved hunting opportunities will also be part of the overall improvement in waterfowl populations and management.

Executive Director's Small Animal and Migratory Bird Management Team. This committee was comprised of professionals from the Commission's Wildlife Management and Conservation Education Divisions. In the spring of 1984 wildlife biologists from across the state were directed to prepare plans that were specific to each of the Coastal Plain, Piedmont, and Mountain regions. These regional plans were completed in April. They identified problems and needs of waterfowl and waterfowlers in each region and provided regional solutions. The regional plans and the statewide plan were combined by waterfowl-project personnel into the final comprehensive state-wide plan. This plan was then adopted with some minor changes by the Wildlife Resources Commission at the June 1984 meeting.

"So what does all this have to do with me?" you might ask. The answer — a lot! In order for our state-wide waterfowl program to work it must first have the strong support of waterfowl hunters and others who enjoy the waterfowl resources of the state. Since the management plan is to be the basic framework of the program, it is the best place to begin to acquire an understanding of what we are trying to do. The plan is not a secret document but rather an open public statement of our management strategies. A look at the plan will show that the program will attack problems on several fronts: management, research and surveys, regulations, education, and enforcement.

Waterfowl management will be applied not only on state-owned lands but the Commission will also try to aid in management on private lands as well. Commission biologists will continue to provide advice to private landowners wanting to improve their lands for waterfowl, and educational aids such as pamphlets and slide presentations will be developed to make their efforts more effective. The wood duck nest-box program will continue, but more emphasis will be placed on procedures for properly installing and maintaining these structures. This will permit their full value to be realized. Beaver ponds are becoming increasingly important to ducks in inland North Carolina and we hope to develop new programs which will encourage landowners to tolerate, or better yet, manage beaver ponds for ducks on their property. The introduction of wild-stock Canada geese begun in 1983 will continue on suitable private habitats until resident nesting populations are established.

Management for waterfowl on lands owned or leased by the Commission was given a great deal of attention in the plan both because of the expense of this program and also because some changes in management emphasis were deemed necessary. Our existing system of impoundments totals over 3,000 acres and was built on either salt marsh or pocosin lands. These impoundments have been extremely popu-



Waterfowl Stamps And Prints Pay Off For Ducks

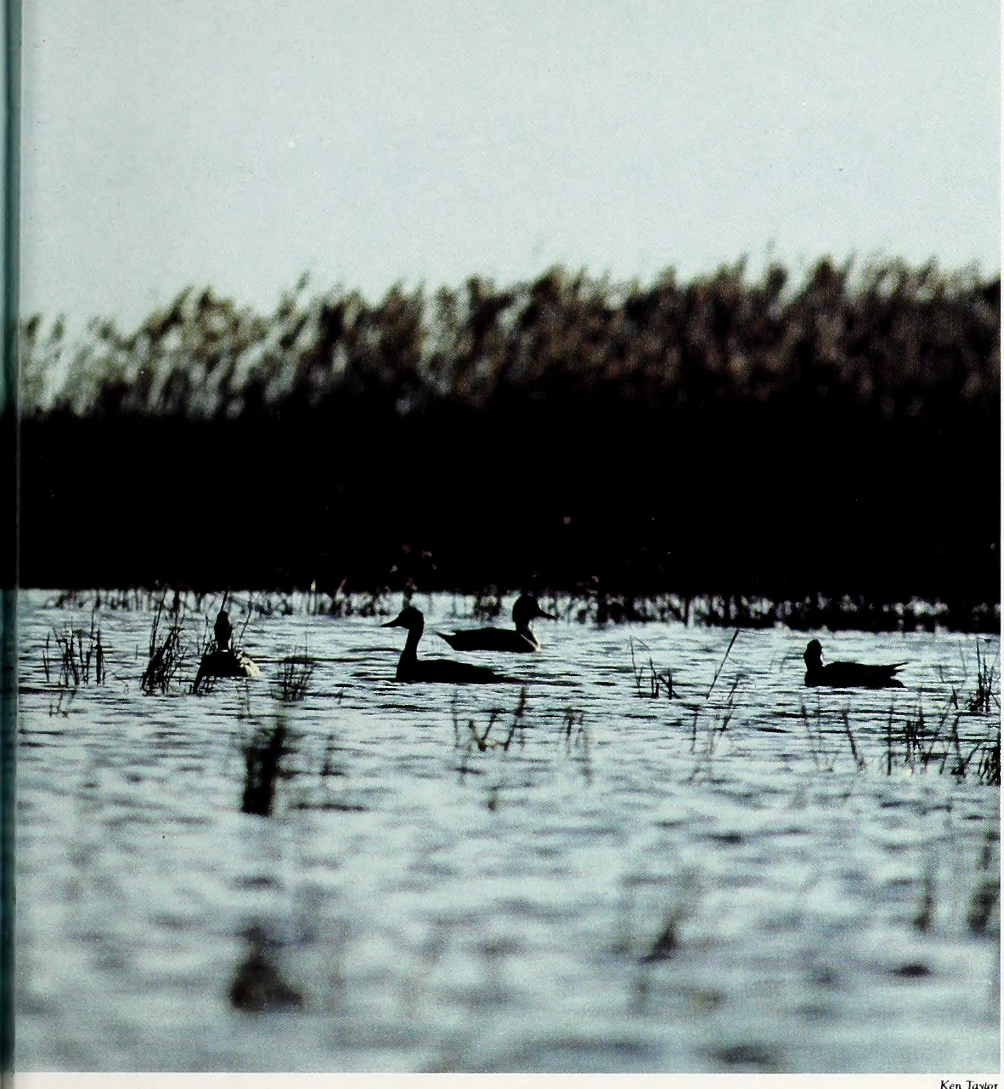
A surge of interest in wildlife art has been the best thing that could happen for waterfowl. In 1983, North Carolina became the 25th state to have a state waterfowl stamp program when it issued its "First of State" North Carolina waterfowl stamp and art print featuring a painting of a pair of mallards by nationally known Minnesota wildlife artist Richard Plasschaert. The program was a resounding success — the second most successful state waterfowl stamp on record — and raised over $600,000 for waterfowl conservation in North Carolina. The 1984 North Carolina waterfowl stamp and art print features a painting of a pair of wood ducks by Jim Killen, another top flight wildlife artist from Minnesota, and it has raised an additional $225,000 for waterfowl conservation.

"The value of the 1983 North Carolina 'First of State' Waterfowl stamp art print has already more than doubled," said Steve Bennett, a wildlife art dealer from Raleigh. "These prints originally sold for $135, and are now listed at $300. I expect these prints may sell for $500 by the end of the summer. 'First of State' prints are always very popular, but subsequent prints by well-known wildlife artists — such as Jim Killen — will also appreciate considerably. In addition to investment value, however, the best reason for buying state waterfowl stamp art prints is to help the resource."

North Carolina waterfowl stamp art prints are not sold by the Wildlife Commission, but are available from art dealers throughout the state. The 1983 and 1984 North Carolina waterfowl stamp art prints are no longer available from art dealers — these are time-limited edition prints, and those that are unsold after the ordering deadline are destroyed to ensure lasting collectibility.

The design for the 1985 North Carolina waterfowl stamp and art print will be selected this winter, and art dealers will accept orders for prints through August 31, 1985.

Wildlife memorabilia collectors and sportsmen should also consider buying 1984 North Carolina waterfowl stamps while they are still available. Individual stamps cost $5.50 each, and are available from license agents or the Wildlife Commission. In addition, full sheets of stamps (each sheet includes 30 stamps) are available from the Wildlife Commission. All unsold stamps will be destroyed after December 31, 1985, to ensure the collectibility of those that were sold. Information on stamp sales is available from: License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.



Ken Taylor

Waterfowl impoundments not only afford ideal places for ducks and even geese to rest and feed, they also offer excellent hunting on the days they are open to shooting. These resting pintails (left) will benefit from the comprehensive plan that is being paid for in North Carolina by the sale of state duck stamps and prints.

lar with hunters in the past and have, at times, furnished outstanding hunting. The location and age of our impoundments, however, produce some extraordinary maintenance problems. Dikes must be rebuilt with increasing frequency and the old marsh root mat which forms pond bottoms is deteriorating. Heavy equipment access by water is much more expensive than if roads were available.

The plan calls for a careful evaluation of each impoundment to determine if it can be maintained in a productive state at a reasonable cost. In some cases it may be wiser to replace existing inefficient impoundments with newly acquired lands that are more naturally productive and can be managed at lower cost. In other cases, use of waterfowl stamp money to improve the productivity of existing areas may be found to be the most cost-effective approach. Abandonment of existing areas without first providing a replacement is not being advocated. Instead, the goal is to provide more man-days of good quality waterfowl hunting for each dollar spent.

The acquisition by the Commission of high-quality waterfowl habitats was given in the plan as the highest priority for money generated by the stamp-print program. Purchase and protection of such key areas would do for wintering and production habitats here in North Carolina what Ducks Unlimited is doing on the Canadian breeding grounds. Additionally, most of these areas, particularly those in the Coastal and Piedmont regions, would be able to provide public hunting without detracting from their value to waterfowl. The management plan goes further to identify key areas where acquisition should be considered and ranks these in priority. A balanced system of waterfowl areas would be the eventual result and would include habitats with state-wide and national significance as well as smaller areas with local or regional value. An effort would be made to include all major habitat types such as coastal marsh, bottomland swamps, inland wetlands, and agricultural feeding areas. The needs of resident nesting populations of black ducks, wood ducks and other species would be given a high priority in managing these areas.

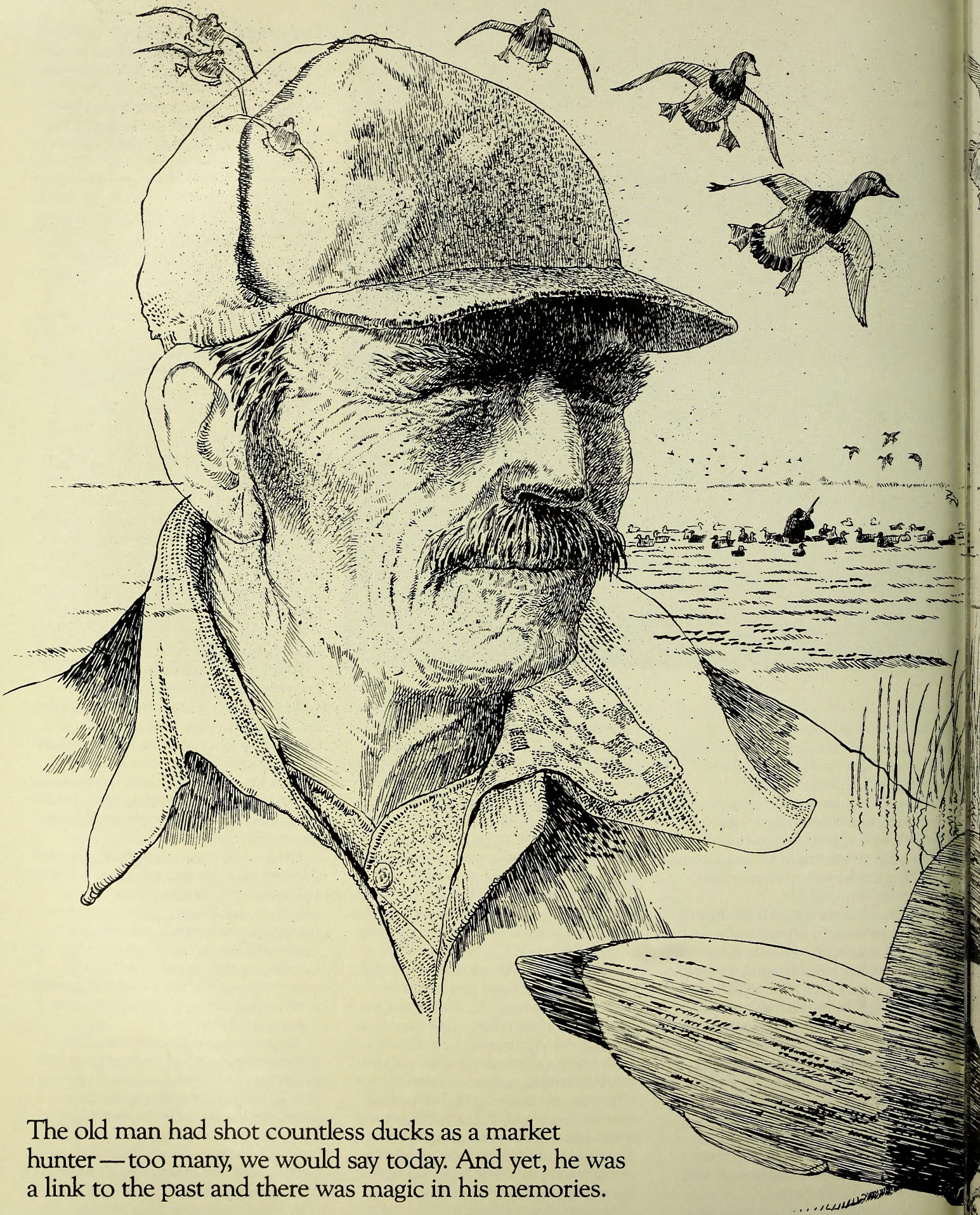
Management of habitat is only one facet of North Carolina's total waterfowl program, which is covered by the management plan. Effective hunting regulations must be developed annually. They must protect the resource yet provide optimum recreational opportunity. Surveys of production, census of wintering populations, measures of hunter harvest, and banding must be conducted on a regular basis to support these decisions. This work is coordinated between the U.S. Fish and Wildlife Service and the various Atlantic Flyway states through the Atlantic Flyway Council. North Carolina has been among the most active states in this body and will continue to be in the future.

The management plan also emphasizes that research should be undertaken primarily for solving specific management problems. Current examples of this type of research are projects to determine ways to prevent further decline of the state's Canada goose flock and a project aimed at obtaining a better understanding of the problem of lead shot ingestion in North Carolina waterfowl.

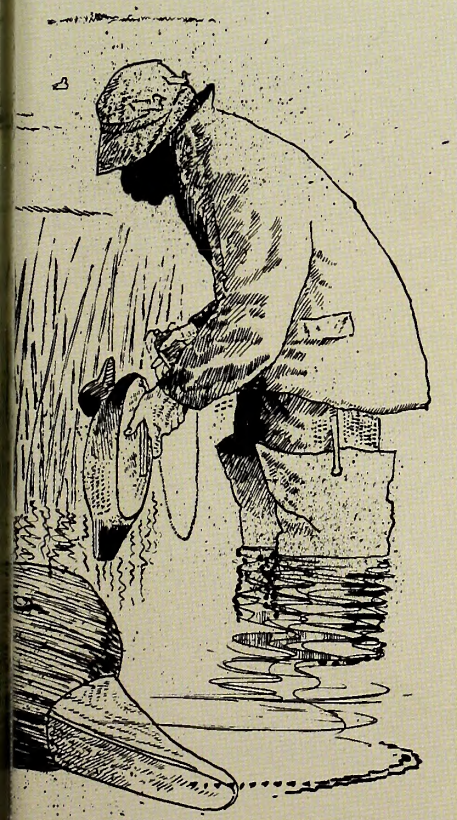
The plan provides for the protection of waterfowl habitats from degradation by pollution, development, drainage and other disturbances by man. Biologists will document habitat losses and monitor destructive factors, and the agency will continue to support key wetland legislation. Educational efforts will provide the public with a better appreciation for the value of waterfowl and other wildlife habitats.

Some new programs have been proposed. We intend to improve our ability to recognize and respond to disease epidemics in our waterfowl populations. Unchecked, these epidemics could result in catastrophic losses of ducks, geese, and swans. Also, we are planning articles and slide shows to educate the public about the need to improve waterfowling ethics and compliance with hunting regulations.

These are only some examples of the strategies the waterfowl management plan prescribes. The North Carolina Waterfowl Stamp and Print Program represents a sound investment in the future of waterfowl resources and the sport of waterfowl hunting in the state. The Wildlife Resources Commission is planning ahead to fulfill the responsibility delegated to it by the sportsmen who are supporting this program. ⊠



The old man had shot countless ducks as a market hunter — too many, we would say today. And yet, he was a link to the past and there was magic in his memories.



The Remains Of Charlie McWilliams

by Jon Wongrey

The light of the sinking mid-January sun gloried North Carolina's Pamlico Sound that day so long ago and from the Silver Lake ferry's warm passenger cabin I saw flocks of geese flying worm-like formations across the sky. I knew that within a matter of hours when a pure pink dawn emerged, I would be in my goose blind and at the ready.

But I had come here not just to hunt geese; I had come to write a story on the last known living waterfowl market hunter south of Maryland or perhaps on the entire Atlantic Flyway. Charlie McWilliams was his name and he lived on the lonely island of Ocracoke and he was well known up and down the Atlantic Flyway for his wildfowling genius as both hunter and waterfowl carver.

The sun was only moments away from signaturing day's end when the ferry docked and I, along with the boat's thin number of winter passengers, drove ashore.

I checked into a motel and then had a supper of oyster stew and fresh-broiled bluefish which my guide, my dinner mate, had caught only an hour ago from the surf near Hatteras. O'Neal was his name and he was a fine specimen suited to the wild island bordered by the great Pamlico Sound on the left and the stormy Atlantic on the right.

O'Neal, who was wind-burnt from too many days at sea and whose lanky frame towered six feet, talked about the morning hunt to come.

He said that the hunting had been stagnant for about a week, but some fresh raw weather was expected over night and tomorrow's goose shooting was expected to be fair.

Then I asked him about Charlie McWilliams and where I could find him. In his watered-down Cockney English he said, "Mate, he's likely not to talk to you about them days when he gunned for the market. He stays pretty much to himself these days. But you'll never meet another like 'im. That's fact, mate."

Then he excused himself and gave me the a.m. hour in which he would fetch me from my bed and room. We shook hands and parted.

I should have known better than to call on McWilliams at such a late hour but I did. This resulted in his curt reply, "I no longer tell my stories of the old days," he said, but courtesy overcame and he told me to come by first thing after my goose hunt. He also gave my guide a good rating and dismissed himself from the door.

I went back to the motel's restaurant and had one last cup of tea and went to bed.

When I opened my door to let O'Neal in, a rush of cold, cold air came in with him.

"She's lookin' good, mate, she is," he said and helped me grab my things.

While we were eating our breakfast of steaming pancakes and smoking country ham we had a box lunch fixed up with six fried egg and ham sandwiches and two large thermoses of tea weakened with canned cream.

Then we went in the night to our boat and motored out to our blind.

A strong wind, more like a gale, came with the sunless day and both geese and ducks were on the move and we watched as they swirled about the low-hung dreary clouds.

"We're in for a bit o'luck, mate," O'Neal said as his seasoned eyes began to study the morning's movement and suggested that I also keep a cocked eye. And I did, for no more than five minutes had passed when a family of geese came honking into the decoys. We shot and killed two and wounded a third. And we listened to their sorrowing two-note honks as they flew away from the blind.

O'Neal got out of the blind and went to fetch the hurt goose while I remained in the blind to look at the lay of things.

The tide was on the return, but not high enough yet to flood the exposed great sand flats and this was the way it was as far as the eye could see in any direction.

Six geese came while O'Neal was out searching for the crippled goose, and I

killed one before thay escaped.

O'Neal was now back. Once he had climbed into the blind with the dead goose, he said, "Let's see if we can pick up a few ducks, mate. It would be a shame not to collect a few ducks on this lovely day."

And lovely it was, for the wind battered the sound and nowhere could geese or ducks find still water. Their numbers became uncountable as they ascended the thickening lead-colored sky. They came to the decoys as if they were coming to bait.

A flock of a dozen or more redheads buzzed the decoys. The drakes were beautiful and we killed one each.

All the while the sound was becoming wilder and wilder. We shot down one black duck apiece and then we each killed two pintails. I shot down one drake and one hen while O'Neal got two sprig drakes.

Then O'Neal spoke: "Mate, we'd bes' be goin'. This storm's likely to get a bit messy before we reach shore."

I yelled above the racing winds and told him what a wonderful time I had had as we packed up and left for shore where we shook hands and parted.

On the way to the motel I stopped at Charlie's house and found him in his workshop fashioning a redhead decoy from a piece of sunbleached driftwood.

It was also in the light of day that I got to see the man. He was a squatty old gentleman with a large, flat, spade-shaped nose who kept a smokeless cigar in his mouth and whose Viking blue eyes were always fixed over the horizon — something no one could see.

"Any luck?" he asked.

"Great hunt!" I replied.

"Get any reds?"

"A couple," I said.

"If you'll give them to me, I'll fix them up for supper. How does that suit?"

"It's agreeable to me," I said and went out to the car for the redheads. Then I went to find a place to clean my geese and ducks.

After I had processed my fowl and had them iced down, I returned to my motel room, bathed and dressed. Then in the dark I walked bent into the wind to McWilliams' house in the same horrid cold that I had hunted in earlier that day.

I found the place and knocked on the door. He opened the door and I was greeted first with the smell of roasting redheads which made giddy the mind and then by Charlie's right hand which hurriedly ushered me into the room's warmth. He seated me by the pot-bellied stove in a white high-back rocker where I rocked over years of wood shavings.

"Should be ready in about five minutes," he said and offered me a dozen shelled select oysters which were not long from the creek.

I dipped each oyster into a hot lemon-butter sauce and gulped them down. "If I would have known you cared so for oysters, I'd a picked another dozen or so," he said and tended to the roasting birds which had now browned nicely and were ready for the table. He took a honed carving knife and made fast work of the ducks which he then put into a serving bowl and ladled with an orange sauce. He served them with a dressing made of cornbread, diced shrimp and clams.

He said not a word while we ate and it was only after he had cleared the table and had poured a round of hot tea that we spoke.

"Son, you wouldn't have believed the way it was out here on the 'Banks' during those faraway days when I gunned for the market.

"I've seen tens of thousands of redheads. One day I saw flock after flock of redheads coming out of the heavens in what seemed to be endless numbers until the last flight touched the water at sundown."

"Everything around here was fowl: ducks, geese, and brant — more than we knew what to do with. A man could walk the marsh and load down a pick-up truck with ducks," he said and stirred a teaspoon of sugar into his creamless tea.

"There was quite a crew of us out here hunting for the market — maybe as many as 40 or 50 on Ocracoke alone. No telling how many there were to the north of us. But the shooting couldn't have been much richer than our piece of the pie because it seemed as if we lived right in the throat of the Atlantic Flyway.

"We, my Daddy and myself, started shooting the first of November and we didn't quit until the last day of March. Now you might think that we killed them out. We didn't. We didn't come anywhere close to gunning out our fowl.

"I've seen tens of thousands of redheads. One day I saw flock after flock of redheads coming out of the heavens in what seemed to be endless numbers until the last flight touched the water at sundown!" he said and in his eyes were visions many men have never nor will see again.

"Care for more tea?" he asked.

I swirled the last lukewarm swallow in the cup, drank it down and said, "Yes."

"Our best paying bird was the redhead. We got a dollar apiece for them, so we seldom bothered the other ducks. Like I said, we had redheads by the thousands and they weren't all that hard to kill. They liked to bunch on the water and to knot up while flying." He chuckled and brought over the tea kettle from the stove.

"Course it wasn't hard to bring home 150 reds a day. I kept two 12-gauge pump-guns, you didn't have to plug them back then, in my sink-box blind. The birds would decoy and I'd get off seven or eight shots before they climbed out of range," said this man whose youth was of sinkboxes, battery boxes and layout rigs and of countless ducks.

"We even shot shorebirds for the Mason Produce Company in Baltimore.

"No, we didn't keep any records. I sometimes wish we had, but at the time there was no point to it. About as close as I can come to telling you how many ducks we killed is to say that each year we bought a carload of flour barrels which was 250 barrels and each barrel would hold 198 pounds of flour.

"The birds were put in the barrels in the rough and loaded on the mail boat to Beaufort, North Carolina. The mailboat would leave Ocracoke every morning at 6 a.m. and would return at 4 p.m. in the afternoon.

"We shipped 10 to 15 barrels out each day, plus we loaded birds on two freight boats that came into Ocracoke twice a week. No matter how you slice it son, we killed a lot of redheads. Shells cost 50 cents a box. My Daddy and I shot up 50 cases of shells each season.

"Geese? We had plenty of geese but they sold cheap on the market and so we didn't make too much of a fuss over them.

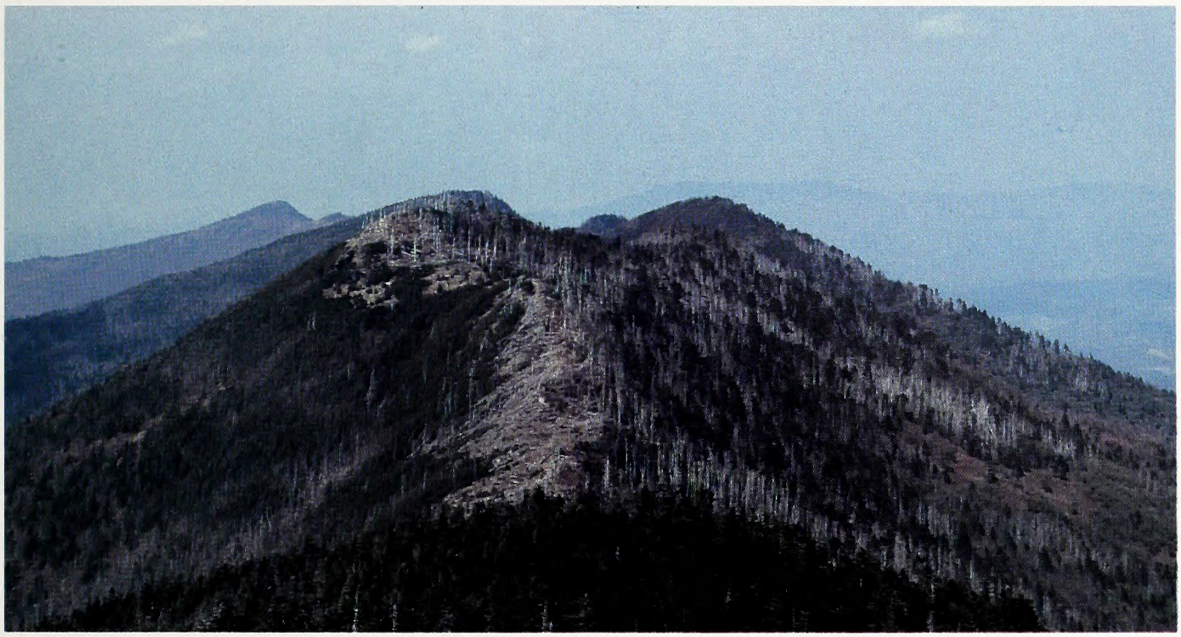
"Funny thing, though, about every family around here had a flock of pet geese which they would use as live decoys. Each goose was web-marked for identification, so when the season ended, the geese were set free to feed and when it was time to round them up we each knew our geese by their markings.

"Well that's about all I remember when I shot for the market," he said and relaxed in his high-back rocker and thought of autumns and the winters when skeins of ducks and geese stained the skies over Pamlico Sound.

I asked him if he had any regrets about the shooting he had done in those days of long ago. "No," he said, "but there wasn't a one of us who could believe that one day we would have very few ducks."

I boarded the cold, wind-swept ferry in the bright sunshine that day so long ago and took away the remains of Charlie McWilliams. ⊠

TROUBLE ON MOUNT MITCHELL



Dying trees show white amidst the evergreens in this view looking north from Mt. Mitchell.

Dying spruce and fir trees on the East Coast's tallest peak may prove to be a warning of serious pollution problems. Here's what we know—and don't know—about the causes.

by Lawrence S. Earley

Dr. Robert I. Bruck leapt to his feet. In his office at North Carolina State University, where he is an assistant professor of plant pathology, he lurched away from his chair, barely avoiding a teetering pile of papers on his desk, and pointed to a relief map of the southern Appalachians hanging on his wall. The map was studded with red pins, each pin representing a spruce-fir forest. He had to shout to be heard over the staccato pounding of heavy construction outside his window, and his voice itself was a hammer, emphasizing each word, drawing out each syllable.

"I'm careful to say that I don't know if we'll have answers in five years. We work seven days a week, 18 hours a day to try to find those answers. But there's just simply no way that we can guarantee anything with this type of Sherlock Holmes science."

Several newspaper articles were prominently displayed on his wall. One was from the New York *Times*, headlined: "New Evidence Indicates Broad Decline in Forests Throughout Eastern U.S." A *News and Observer* headline was more tantalizing: "Mystery of the Ailing Trees."

Bruck has trees on his mind, ailing trees to be sure. They explain the urgency in his voice. For he believes that right now, in the high elevations of the southern Appalachians, the Fraser fir and red spruce forests may be slowly being destroyed. His research indicates that many of these trees are dying. Similar phenomena have been found by other researchers in the north, and in both areas air pollution is heavily suspected.

Bruck's research is still in the preliminary stages, and his findings have not been unanimously endorsed. Some scientists have found his public statements alarmist, preferring not to comment until the evidence is presented in scholarly publications.

Bruck admits that what he has found is hypothetical. "We don't have any good convincing evidence pointing to a specific cause," he says about the pollution he has found and the dying trees.

His findings were first brought before the public eye when in Congressional testimony earlier this year, Bruck maintained that the spruce and fir trees (see pages 2-3) on Mt. Mitchell were both dropping their needles and dying at elevations above 6,350 feet. Above that level, he found, regeneration of spruce or fir was scarce. Trees were losing fine feeder roots. Most startling, perhaps, was that between 80 to 100 percent of the dominant spruce and fir trees he had examined showed a 500 percent decrease in annual growth rate starting between 1958 and 1963.

In addition, he had discovered massive amounts of pollution on pristine mountain peaks. The top of Mt. Mitchell, he was quoted as saying, resembled a "garbage

Trouble On Mount Mitchell

dump" of pollution with extraordinary levels of acid moisture, ozone, nitrogen and heavy metals, including lead. The higher the elevation, the worse the pollution.

Bruck's testimony fueled a fire that was already raging concerning the controversial effects of air pollution, including acid rain, on forests. The source of most dangerous air pollution is man, mostly his industrial activity. Earlier, researchers in the Northeast had examined red spruce forests in New York, Vermont and New Hampshire and had found virtually the same symptoms as Bruck later found. The spruce were dying, starting in the crown and branch tips and progressing downward and inward. Growth rates were slowing, a phenomenon that had no precedent in the previous 200 years. Massive amounts of pollutants, including acid deposition, were found on study sites.

There were disturbing parallels between these forest declines in the American Appalachians and the rapid decline of forests in Central Europe, especially Germany's Black Forest. In 1981 a survey estimated that eight percent of German forests were exhibiting signs of dieback; in 1983 a follow-up survey found 34 percent of the trees affected. The blight, called "Waldsterben," affected spruce, fir and eight other species, including important commercial species, at all elevations.

What complicates the matter is that for many years the Fraser fir trees on Mt. Mitchell and other high-elevation peaks have been infected by an insidious little insect known as the balsam wooly aphid. (See box.) The aphid is a tiny bug that was accidentally introduced in the United States around the turn of the century on nursery stock. It was discovered on Mt. Mitchell in the late 1950s and within a few years had killed 275,000 firs on that peak alone. The effects of the aphid damage have been visible for years. If you walk the ridges of Mt. Mitchell, you are sometimes in a ghost forest, with skeletal sticks of dead trees looming through the wet mist. It is a haunting experience.

Until recently, the deaths of the Fraser firs were attributed solely to the balsam wooly aphid. Then Robert Bruck began to examine the red spruce trees at lower elevations. "There's one thing about red spruce," he says. "Red spruce is immune to the balsam wooly aphid. But what I found was that in many cases the red spruce was just as bad off as the Fraser fir, with no specific biotic (natural) agent that could be responsible."

If spruce and fir were dying, what

Lawrence S. Earley

This once thriving forest of Fraser firs on Mt. Mitchell is now an eerie graveyard, victim of the balsam wooly aphid and possibly air pollution.

could be killing them? Bruck suspects air pollution.

"The top of Mt. Mitchell has in excess of 250 parts per million of lead in the surface soil," he says. (For comparison's sake, a sample from soil next to a road in downtown Raleigh might read 40 parts per million, which is still very high. Lead has been suspected to cause mental retardation in children.) "Where does lead come from? It comes from two sources — smelters, which we do not have a lot of here in the eastern United States, and from automobile emissions. Okay, but when lead comes out of an automobile exhaust pipe does it just drop out of the pipe and go down? The

F. P. Hain

F.A. Arthur

Prolific parasites, balsam wooly aphids (top right) swarm over a Fraser fir trunk. Attacking only the Fraser fir, the European insect punctures the tree with a mouthpart that is five times longer than its body length. The tree responds by forming premature heartwood, or "rotholtz," in one or more of its growth rings (top left). The dense wood conducts water poorly and the tree eventually dies.

Wooly Aphids Share The Blame

Though the balsam wooly aphid (*Adelges piceae*) has been blamed for the deaths of hundreds of thousands of Fraser firs on Mt. Mitchell, some researchers believe that the tiny insect may actually be playing a secondary role.

N.C. State entomologist F. P. Hain and his research assistant Frank Arthur are testing the hypothesis that the firs are already severely weakened by atmospheric pollution, and that the aphids are only finishing them off. "Our hypothesis is that the aphid is simply taking advantage of a stressed tree," Hain says.

The aphid attacks the Fraser fir by sinking its sucking mouthpart deep beneath the bark. Normally, a tree would respond to a wound of this type by forming a layer of cells to wall it off. But when the aphid attacks a susceptible fir, the tree reacts as if the wound was very deep, forming "rotholtz," or red heart, in one or more of its growth rings. This very dense, premature heartwood inhibits the ability of the fir to conduct water, causing the needles to die and the foliage to turn a reddish brown before the tree dies.

"The aphid has been found throughout the southern Appalachians, but the deaths of Fraser firs are less widespread," says Hain. "Within the six concentrations of spruce-fir forest, high fir mortality is more common on the southern peaks (Great Smokies, Black Mountains, including Mt. Mitchell, and Plott-Balsams) than on the northern peaks (Grandfather Mountain, Roan Mountain and Mt. Rogers)."

Several theories attempt to explain why some trees seem to be more susceptible to aphids than others — genetic differences between trees, for example — but Hain is impressed with the role of atmospheric pollution.

In a recent paper, Hain wrote: "The evidence, although circumstantial, seems to suggest that those mountain tops with the greatest amount of Fraser fir mortality are also sustaining the highest levels of atmospheric deposits because of their elevation... and their proximity to areas of dense human pollution."

Hain goes on to say that "a growing body of evidence" suggests that pollutants can weaken plants and open them up to insect attack or disease. Whether that is what is happening on Mt. Mitchell, only time and further research will tell.

TROUBLE ON MOUNT MITCHELL

answer is obviously no. Various compounds, such as lead sulfate and lead iodide, are formed and wafted up into the atmosphere." They end up on mountain peaks in tremendous quantities.

He asks my question. "Why?" To answer he weaves a picture of moisture-laden clouds that sock in the mountain tops seven days out of 10, for at least part of the day. These clouds, studies have shown, are dense with pollution. As the clouds, in the form of mist, roll across the peaks the polluted moisture condenses on the branches, needles and trunks of trees, falling to the earth. The trees, in effect, are combing out pollutants from the clouds.

He points to a photograph of an evergreen tree covered in rime ice. "Rime ice is formed by cloud moisture," he says, "and builds out like a stalactite in the direction of the wind. All the ice you see there is not from rain or snow, but from cloud that condensed and froze on the branch. The pH (a measurement of its acid content) of the ice right there is 3.1. Now 3.1 is more acidic than vinegar." But Bruck points out that the cloud is also pregnant with a host of other pollutants: hydrocarbons, sulfur, heavy metals — including lead. All toxic substances. All eventually ending up in the soil of mountain peaks, and eventually in the spruces and firs.

There are several theories explaining how pollution can be killing the trees. One is based on the presence of another pollutant that Bruck has found on Mt. Mitchell — nitrogen. "Based on our initial studies," he says, "we would estimate that there are approximately 40 pounds of nitrogen per acre that are seeded into the top of Mt. Mitchell on an annual basis." Nitrogen is a nutrient. It makes plants grow. But in excessive amounts it causes plants to grow too fast, resulting in thin cell walls and loss of frost hardiness. Plants thus afflicted lose their leaves and die back. "These are exactly the symptoms we are seeing on Mt. Mitchell and other peaks right now," he says.

Bruck has also removed cores from spruce and fir trees at various sites in the southern Appalachians. A core, in effect, is a window showing the growth rings of a living tree. What the cores from these sites and others show about the growth of these trees has been startling. "The thing that we can say conclusively is that beginning in the period 1958 to 1963, in the red spruce and fir forests, at high elevations from Maine to Georgia, something very dramatic and profound took place. There was a five-fold decrease in the annual growth rate of dominant — that's the key word — vigorously growing spruce and fir trees. This occurs on between 80 and 100 percent of all the trees that we cored, and it happens up and down the Appalachian spine.

"What does this mean? We don't know."

Some of Bruck's findings have already been questioned. This is perhaps inevitable in the early stages of scientific research when rival hypotheses are being tested. Some scientists question the extent of the spruce-fir damage that Bruck has found; others wonder how large a part pollution plays in the trouble zone, and stress the difficulty of identifying a specific cause.

Don McLeod, a plant ecologist from Mars Hill College in Mars Hill, is more impressed with the health of the spruce-fir ecosystem than its ailments. As we hiked along a trail on Haulback Mountain, 300 feet below Mt. Mitchell, he pointed to a graveyard of dead Fraser firs that had been blown down in a huge swath. Among the downed skeletons were seedlings and young firs growing vigorously and in great profusion.

"It looks like the wooly aphid killed the canopy firs," McLeod said. "But if you look around, you'll see that even in an area that doesn't look like it's got much reproduction, some little ones are coming in.

"I see a healthy ecosystem here, though the dead trees are not very attractive. There's a lot of fir regeneration and we can see the herbs commonly associated with a spruce-fir ecosystem — asters, turtleheads, red raspberry. Now the future of the fir is in doubt once the trees get older. The wooly aphids don't attack trees at this height, but once they get up to 12 or 15 feet they may be hit, too. But I look at the forest floor here and it looks fine."

McLeod has a number of study sites at different elevations around the mountain. "My data suggest to me that there is regeneration all over the mountain," McLeod said.

McLeod is not sure what role pollution plays in the delicate spruce-fir ecosystem on Mt. Mitchell, but if it were ailing he would suspect first a century of human land use in the area. "A good deal of the spruce and fir was cut over and then burnt over early in the century. Fire can hold back regeneration for a long time. Take a look at the Mt. Mitchell topo map and just look at all those little squares that indicate buildings. Fifty years ago there were people living all over this mountain. There were 300,000 visitors up here last year. My point is that in order to

Robert Bruck

Terry Shankle

Robert Bruck

Deadly and beautiful, rime ice at Mt. Mitchell (above), is formed by moisture-laden clouds that bathe the high elevations seven days out of 10. These clouds have been found to be dense with pollution. When the clouds are intercepted by the trees, the polluted moisture condenses on branches and eventually ends up in the soil. Scientists are studying the connection between this pollution and alarming signs of stress in Fraser firs and red spruce. At near left, a healthy fir branch contrasts with severe yellowing of a dying fir, damage not connected with the balsam wooly aphid. At far left, a core sample taken from a live red spruce shows dramatic shortening of annual growth rings (top) contrasted with normal growth in the years before the early 1960s.

Lawrence S. Earley

Shattered skeletons of Fraser fir litter the base of Mt. Mitchell's tower, the highest point on the East Coast. Since the late 1950s, visitors have noted the spread of these dead trees.

Trouble On Mount Mitchell

understand Mt. Mitchell, you have to look at the history. The spruce-fir — any upper elevation ecosystem — is very fragile, and recovery is slow."

Another scientist, Wayne Swank, stressed the complicated nature of sorting out potential causes of a forest decline. Swank is a plant ecologist with the U.S. Forest Service at the 5,400-acre Coweeta Hydrologic Laboratory near Franklin, North Carolina.

"It's obviously a complex ecosystem," he said of the spruce-fir forest. "You have had an insect infestation that has been there for a long time. And that very definitely alters the nutrient cycles and the hydrology of the area. It's also one of the most extreme environments we have in the eastern United States in terms of climatic conditions, wind, temperatures and so forth. And then if you try to layer on top of that some other insult on the landscape, and try to figure out who's doing what to who, you have a very complex situation in forest-ecosystem research."

Bruck maintains that his investigations are still in the early stages, and that establishing a specific cause and effect relationship will be difficult. "Regardless of what the news media has been saying," he says, "we are not making up our minds what the problem is. We know there is a great deal of pollution up on tops of mountains. The fact is there is from 10 to 100 times the concentration of various pollutants at the tops of these southern Appalachian peaks as you would find right here in Raleigh — a metropolitan area. This cannot be ignored.

"But to say that since we've got pollution there, and we've also got tree mortality, that therefore the first caused the second — that's the kind of thing you've got to be very careful about. In scientific jargon, it's only a correlation.

"We are trying desperately to search for every possible natural cause that could be responsible for (the dieback)," he says. Among the possible natural causes are land uses, insects and disease. "It is possible — not probable — that the things we are seeing may be simply a natural phenomenon that occurs every 500 years, perhaps every 1,000 years. We don't know."

Robert Bruck

German and American scientists gathered at Mt. Mitchell in July 1984 to exchange information about forest declines in Europe and the United States. Forests are dying in Central Europe at a rapid rate, and European scientists have blamed acid rain. A Fraser fir seedling (left) growing on Mt. Mitchell gives hope for the future of these forests.

Brian Taylor

One possibility Bruck does not want to even think about is that the growth declines might also be found at lower elevations. "You're sitting in the wood basket of the world," he says. "The vast majority of pulp paper and a great deal of timber products produced in the entire United States are produced right here in the Southeast.

"To me, if there's a one percent chance that the same thing that happened in Europe may happen here we better get a program of research, and I mean intense research, off the ground posthaste. If there is something that is controllable, we better find out what it is. If there's not something that is controllable and it's going to happen anyway, God help us."

A large research effort is in fact already gearing up. According to John Hendee, U.S. Forest Service Assistant Director for Virginia and the Carolinas, 50 study proposals dealing with the spruce-fir ecosystem have already been reviewed by a management team from the Southern Appalachian Research/Resource Management Cooperative. They have been consolidated and will be subjected to further review before the actual research, with likely federal funding, will begin. The Spruce-Fir Ecosystem Assessment Program, as it is called, may be spread over five to seven years.

In the meantime, what can be done? If the matter is as serious as first reported, are not further reductions in the emissions of lead, sulfur dioxide and other prime suspects in order? Wayne Swank: "What do you reduce? Even if you prove that pollution is causing problems, you've got acids, oxidents, heavy metals, a whole range of things. What do you cut down emissions for — everything?"

Robert Bruck echoes these sentiments. "Do I think that air pollution may be stressing the ecosystem? That it could be causing it to break apart? The answer is yes. But do I have conclusive evidence that would lead me to say unequivocally that we must start regulating air pollution because it is killing our forests? The answer is no."

Of course there is a hazard to this otherwise admirable scientific caution. We may find in time that the spruce-fir forest decline was only a brief phenomenon, followed by restoration of these ancient forests to their former health. Or, we may find that air pollution was indeed killing the trees. By then, however, it may be too late to act.

I talked to Ellis Cowling about this dilemma. Cowling is Associate Dean of the School of Forestry at North Carolina State and a long-time advocate of stiffer air-emissions standards. He is impressed with Robert Bruck's findings, and while he agrees with his colleague's caution on the matter of acting hastily and with not enough evidence on the table, he points out that there is often a 10-year lag between the time controls are found to be necessary and the time they are actually put into place.

But Cowling is mainly concerned that the attention given to Mt. Mitchell's problems obscures a larger issue. "In one sense it's a pity that we're focusing on the effects (of pollution) on the forest, about which we don't know a lot, while the general effects of pollution are well-known." He says that of the four primary air pollutants — sulfur dioxide, nitrogen oxides, organic compounds (ozone) and toxic metals — nearly all are known to be toxic to human health and the welfare of livestock, crops and even buildings.

From this perspective, therefore, Cowling urges a broad program of air-emissions controls. "I would say the prudent society would think broadly," he says, "even though every specific step helps. If you take the lead out of gasoline, you only have the smelters left. Maybe we ought to be dealing with smelters, too." In a recent paper, Cowling advocated across-the-board reductions in pollutants, saying: "Significant reductions in air emissions of sulfur, nitrogen, toxic metals, and organic compounds will have significant and simultaneous beneficial effects on human health, visibility, materials damage, surface water quality, and both crop and forest productivity."

To this practical prescription little needs to be added. To someone with a long view, the troubles on Mt. Mitchell are new and yet not terribly unfamiliar. The history of the southern Appalachians has been marked by vast despoilation and devastation spun from the twin motives of individual opportunity and greed. From rapacious logging to erosive farming, our highlands have had much to endure. If it turns out that the spruces and firs are dying — and the answers are by no means in — it will only be the latest manifestation of man's flawed entrance into that green land. It may well be the hardest to correct. ⊠

Jack Dermid

Let It Snow, Let It Snow

It may be nature's most dazzling display, and yet little was known until this century about how snow is formed.

by Mark Taylor

I was about 16, and had just finished washing a a mountain of dishes at a church supper. I was tired and wanted to go home. When I stepped out the back door of the steamy kitchen, I entered a magic kingdom.

Great flakes of snow, looking for all the world like the fake snow in an old Hollywood movie, swirled from the sky. The fresh powder glittered like millions of diamonds in pools of light under the street lamps. Instead of going home I turned and walked downtown through silent deserted streets. The century-old brick mills that lined the river no longer looked grim and time-worn, but had acquired an aging dignity. The shabby tenement houses in Smoky Hollow exuded a warm glow. I stopped at a bridge on the outskirts of town and listened to the hiss of the snowflakes as they met the dark, turbulent waters. It was many hours before I returned home that night.

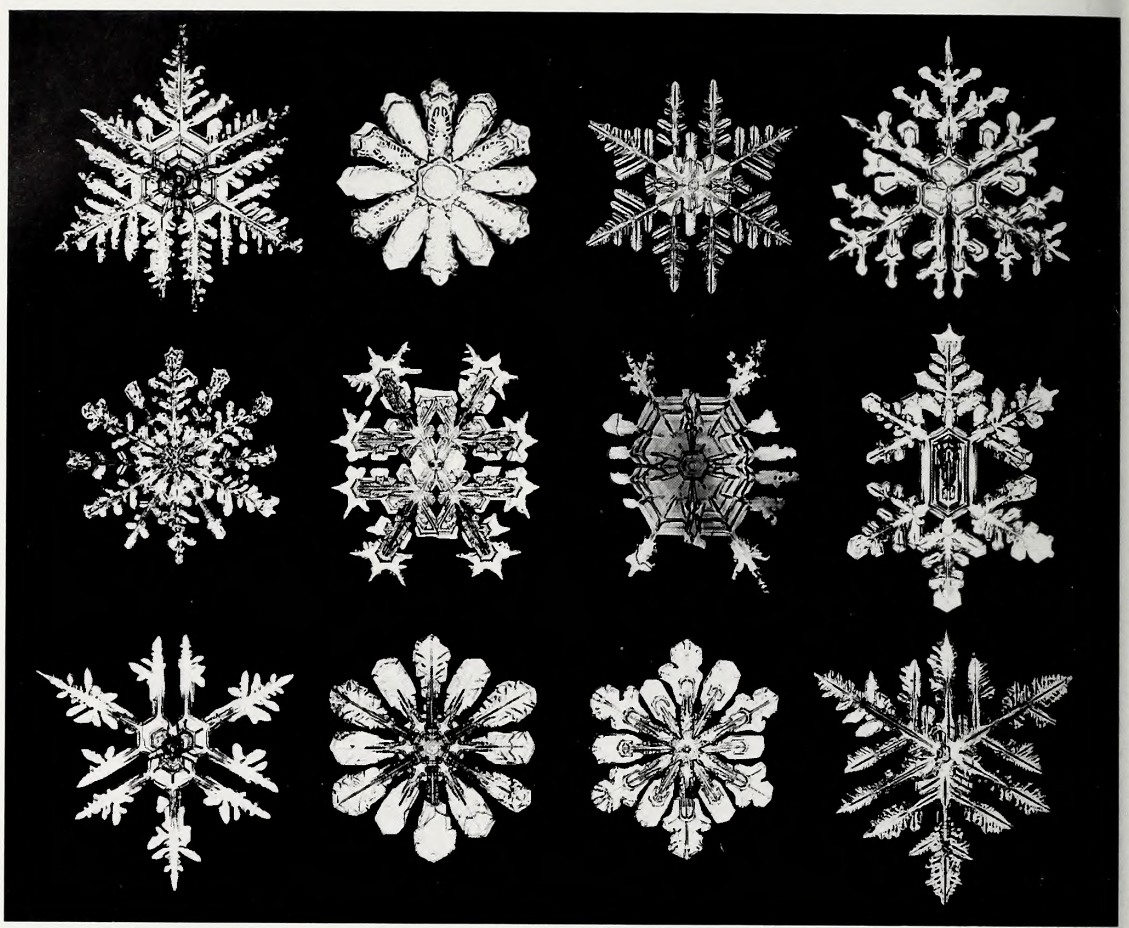
Snow has inspired childlike wonder in man for hundreds of years. Early scientists—such as Johannes Kepler, the famed astronomer who discovered the laws of planetary motion, and Rene Descartes, the brilliant French mathematician—both published papers dealing with snowflakes or snow "crystals" in the late 1500s and early 1600s. Yet, little was known about how snow formed until well into this century, and it took an eccentric dairy farmer to lead the way.

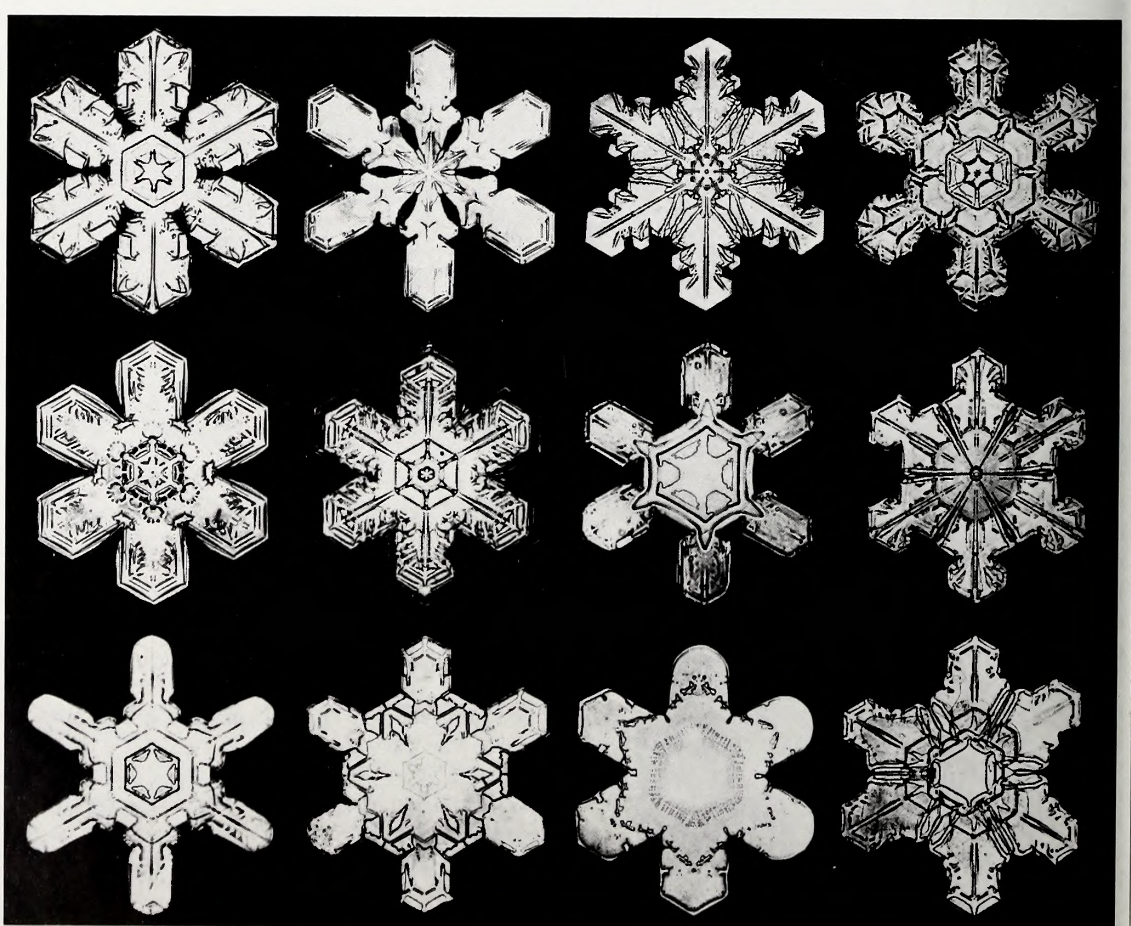
Wilbur Bentley of Jericho, Vermont, was 15 years old in 1880 when his parents gave him a microscope for his birthday. Anxious to try his new gift, he placed a few snowflakes on a glass slide and took the instrument outdoors. He discovered a whole new world—the infinite variety of snow crystals

Snow is a sometime thing in North Carolina, and many of our storms occur in late winter or even early spring. The latest measurable snow on record in the Piedmont and Coastal Plain resulted from a storm that dropped nearly 2 inches on April 18, 1983.

Let It Snow

These "photomicrographs" (right) of snow crystals taken by Wilbur Bentley show the amazing variety of forms that snow can take. All snow crystals, however, are hexagonal in shape. As ice crystals freeze, heat is released. This sets up a miniature whirlpool around the growing crystal, accounting for its characteristic shape.





that are found in infinite numbers in the course of a Vermont winter.

Bentley tried sketching the crystals, but was no artist. When he was 19, however, he salvaged parts of an old compound microscope and studio camera and built a device that would enlarge and photograph a single snow crystal. He housed this device in an unheated shed, and his work caught the attention of a professor at the nearby University of Vermont. Before long his "photomicrographs" of snow crystals were published in books and magazines and were widely used in traveling stereoptical or "magic lantern" slide shows. Bentley was a lifelong bachelor and no doubt his neighboring dairy farmers considered him an "odd stick," but before his death of pneumonia at the age of 63 the "snowflake man" from Vermont had achieved national recognition and had photographed over 6,000 snow crystals.

Bentley was more interested in snow as art than science. In the 1930s and 40s, however, a Japanese professor of physics named Ukichiro Nakaya used Bentley's photographic techniques to help him solve several long-standing riddles — how snow was formed, for example; what accounted for the seemingly endless variety of snow crystals; and, what were the characteristics of snow packs? Nakaya worked on these questions at the University of Hokkaido in Sapporo, utilizing the abundant snowfalls of Japan's northern island. He also built the world's first cloud chamber to conduct his studies.

He found that snowflakes are composed of countless ice crystals that form around minute specks of dust high in the atmosphere. Individual cloud droplets in vaporous form — so tiny that 10,000 could fit in a line across the head of a pin — are drawn to this speck and freeze. When these droplets freeze, heat is released and sets up a steep temperature gradient around the growing ice crystal. In turn, this creates a miniature whirlpool that evenly distributes particles of vapor around the growing crystal. (The heat released in this process is substantial. In fact, the energy released in a 10-inch snowfall over one square mile is the equivalent of the atomic bomb that was dropped on Hiroshima.)

Nakaya discovered that there are eight basic types of snow crystals, and 37 different forms within each type. The classic, delicate six-pointed "stellar" snowflakes that Bentley so loved to photograph are actually in the minority. More common are the other types that include hexagonal plates, needle or columnal crystals, and combinations of these. The temperature and humidity in the upper atmosphere determine the shape of snowflakes and the character of snow.

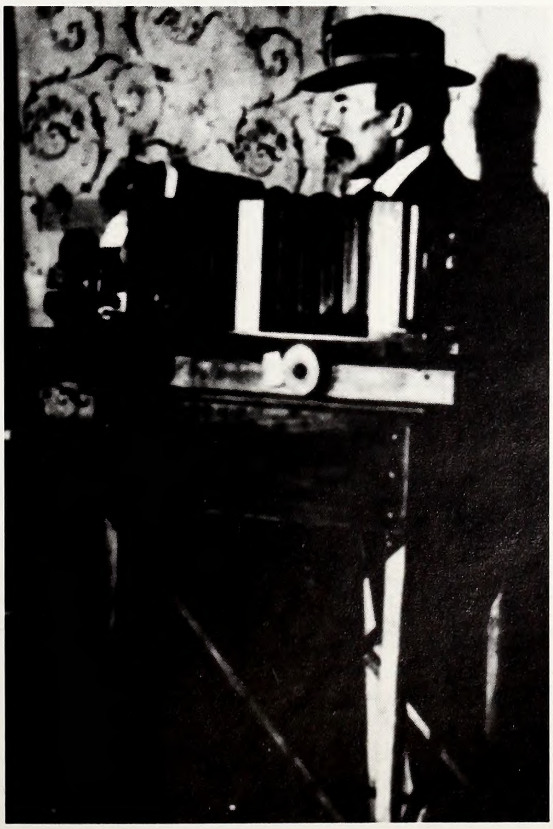
Extremely cold temperatures, for example, produce very small, sharply pointed snowflakes. Since the humidity in the atmosphere is very low, these flakes do not clump together as they fall and they lie lightly on the ground, their brittle plumes barely touching. This dry, fluffy powder snow weighs only 150 pounds per cubic yard, and may be as much as 97 percent air by volume.

If you walk on this snow, you'll notice a loud crunching sound caused by the tips of the crystals breaking. The snow is so dry that attempts to pack it into a snowball are futile. There is little moisture to bind the flakes together, and the tips of the crystals break off instead of interlocking. Cross-country skiers who expect this snow to furnish a fast ride are surprised to find that they can barely get started — the sharp tips of the crystals offer surprising resistance to the bottoms of the skis.

Most snows in North Carolina, however, are wet and heavy. Warmer upper atmosphere temperatures and higher humidity produce flakes that bond together in clumps as they fall and form an interlocking mass on the ground. This snow is only 70 to 80 percent air, and weighs in at a roof-crushing 1,500 pounds per cubic yard.

Another discovery that Nakaya made was that fallen snow begins to compress immediately regardless of temperature. The sheer weight of snow causes the tips of ice crystals to break off and settle, reducing snow depths even during the course of a storm. Wind and sun also cause compression of the snowpack. Crystals at the surface evaporate in below-freezing temperatures, and melt at warmer temperatures. This loss is a slow process, however, because snow is extremely reflective and an excellent insulator. Tiny ice crystals act as prisms, and turn back about 87 percent of the sun's rays. This creates a false impression of dazzling whiteness. In reality, snow — like ice — is gray.

Below the surface, the air spaces in the snow offer excellent insulation. In cold climates a thick blanket of snow prevents tree roots and small plants from freezing. Mice, squirrels, rabbits and other small



Around the turn of the century, Wilbur Bentley (left), the "Snowflake Man" from Jericho, Vermont, turned a youthful hobby into a lifelong obsession. Salvaging parts from a compound microscope and an old studio camera, he built this apparatus to photograph snowflakes. He took over 6,000 "photomicrographs" of snow crystals that were widely used to illustrate books, magazines, and "magic lantern" slide shows.

Let It Snow

animals survive the winter by sleeping or hunting in tunnels and dens beneath the snow. Snowfalls in North Carolina are relatively uncommon, except at high mountain altitudes, and they have little effect on animals and vegetation. "Our snows are so short-lived and melt so quickly that they seldom have any influence on wildlife," said Grady Barnes of the Division of Wildlife Management of the N.C. Wildlife Resources Commission. "Most animals just sit tight until the snow disappears."

In North Carolina borderline conditions for snow are the rule. Only a few degrees of temperature in the atmosphere separate snow from rain, sleet or freezing rain. Snow, for example, begins as ice crystals in the atmosphere and maintains this form. Rain may also begin as snow high in the clouds, but melts as it falls. Sleet is formed when rain hits a layer of very cold air above the earth and freezes. Freezing rain — or "glaze" — is created when cold rain strikes the frozen ground and freezes on contact.

"A single weather pattern accounts for our big snowstorms in North Carolina," said Larry Lee, a meteorologist with the National Weather Service at Raleigh-Durham Airport. "First, a high pressure area containing very cold air moves into the state from the north. Meanwhile, a stationary low pressure front forms along the East Coast. Then, an upper level storm sweeps across the southern United States, hits the stationary low on the coast, and moves north — picking up moisture and intensity as it travels. When this storm hits the dense wedge of cold air that is covering North Carolina, it is thrust up into the atmosphere. This moist air quickly reaches its dewpoint, and if it is cold enough big snows can result."

This was the situation in the winter of 1980 when Elizabeth City received 33 inches of snow from two storms in February and March. "Both of these storms followed that classic pattern," said Lee. "Storms moved up the coast and hit a cold, high-pressure area over North Carolina. They intensified as they headed out to sea off our coast, which is why Elizabeth City was hit so hard."

In March of 1960, a similar situation produced North Carolina's worst winter weather on record. "Extremely cold air from the North covered the state," said Lee, "and a series of storms moved up the coast and stalled against the Blue Ridge mountains. The resulting snows and cold broke all records for 'severe and persistent' winter weather. The temperatures were often 20 to 30 degrees below average, and the average temperature for the month exceeded the coldest January on record by five degrees." Portions of the mountains in northwestern North Carolina and southwest Virginia were so deeply buried that helicopters were used to airlift supplies to remote farms, and the military and National Guard were called out to clear the highways.

"Of course, sometimes we have all the elements needed for a big snowstorm and end up with rain or sleet instead," said Lee. "The atmosphere is a highly complex system, and predicting snow is difficult at best. With the borderline conditions we encounter in North Carolina, it's a forecaster's nightmare."

Smaller snows in the mountains can be traced to the terrain. Fronts from the north often move south and hit the mountains, are thrust upwards into the atmosphere, quickly cool, and reach their dewpoints — dropping rain or snow. In the Pacific Northwest, this pattern of "orthographic" lifting and cooling of moisture-laden air from the Pacific Ocean results in average snowfalls exceeding 500 inches per year in the high Cascade and Sierra mountains. In North Carolina, the effect is most pronounced on high peaks in Yancey, Mitchell and Avery counties.

"The summit of Mount Mitchell receives about double the precipitation of surrounding areas," said Lewis Ledford, supervisor of the Mount Mitchell State Park at the summit. At 6,684 feet, Mount Mitchell is the highest point in the East. "We average about 100 inches of snow annually, although in 1977 we recorded over 180 inches. We've had snow in every month of the year, but we usually see our first flurries in October and it's late December or early January before we have snows that last. We usually have several big storms that drop 10 to 12 inches of snow, and there are many days when we have small, continuous flurries."

There was a time when snow was a symbol of innocence, and the phrase "pure as the new-driven snow" was the ultimate compliment that could be bestowed upon a maiden. Unfortunately, much of our new-driven snow is no longer pure — and the tiny specks of dust that form the hearts of the ice crystals are the culprits. The first concern over the purity of our snow arose in the 1950s when above-ground testing of nuclear weapons by Russia and China prompted concerns about radioactivity. Today, it is not "red snow" but "acid snow" that concerns scientists. Indeed, this pollution — along with acid rain and the presence of lead and other toxic pollutants — is being studied as a possible cause of the decline of high-elevation spruce-fir forests in western North Carolina.

"We're finding nitrate and sulfate particles in the snow that is falling on the western mountains," said David Silsbree, a scientist at the Uplands Research Center in the Great Smoky Mountains National Park. "This corresponds with a definite downward trend in the acidity of snowfalls over the past 30 years. The pH of the snow in the park averages about 4.3 (moderately acidic) and we have recorded snow with a pH of 3.5 (very acidic). It's impossible to trace this back to a single source, but most of our acid snows come from the heavily industrialized portions of the Deep South or the Tennessee Valley."

Snow remains, as it has always been, a mixed blessing, a bane to motorists and a holiday to children, a source of pollution to western forests, and a protective blanket of warmth for small plants and animals. To see snow at its best, however, you must walk quietly in a storm on a cold winter night. It's an experience that will make you believe that peace on earth may be possible after all. ⊠

A History of Blues

When the big chopper bluefish hit our coast 15 years ago, they jazzed up the fishing, but what are the chances they'll stay?

written and photographed by Joel Arrington

The first big bluefish I ever saw hit trolled spoons in the rain on Wimble Shoals out of Oregon Inlet in May of 1969. They weighed about 12 pounds apiece and I was amazed. After years of saltwater fishing in North Carolina I had never caught a bluefish larger than about three pounds; nor in my ignorance had I even heard of such jumbo blues anywhere. Previously the biggest I had seen were six-pounders some of us had caught on a headboat out of Montauk, New York, in 1960.

The big bluefish we boated that spring day presaged an angling era on the Outer Banks and in the western Atlantic Ocean generally that has not run its course to this day. We had no way of knowing that big bluefish populations would continue to expand and that the pursuit of them by hoards of new anglers would change the nature of surf fishing on the Outer Banks for the next 15 years and more.

I should not have been surprised at the size of those fish we caught on Wimble Shoals. If I had been better read on blues, I would have known that the big fish have a history of population surges, sudden disappearances and long absences, and that a

The most recent cycle of giant bluefish began in the late 1960s, but prior to that, big choppers like this one (above) had not been seen here in large numbers since the 1930s.

"A bluefish blitz has come to be the single most memorable angling experience of many Outer Banks surf fishermen, the holy grail sought by thousands of hopeful pilgrims to the Banks lured by accounts of wild fishing and blood in the water."

When the big blues hit the beaches, especially at Cape Point on Hatteras Island (above), action is often fast and hectic as anglers stand shoulder to shoulder to get their share. The blues drive bait against the beach (below), and it isn't unusual for smaller blues, trout and other fish to actually run ashore to escape the murderous jaws.

few large blues had been caught by sport fishermen in North Carolina through the '60s. However, not until 1970 were the runs major, the anglers who experienced them numerous, nor was the publicity about them extensive.

It must have been Outer Banks publicist Aycock Brown who first used "blitz" to describe the way hundreds, perhaps thousands, of big blues congregate in the surf zone and trap bait and sometimes larger fish against the beach. A bluefish blitz has come to be the single most memorable angling experience of many Outer Banks surf fishermen, the holy grail sought by thousands of hopeful pilgrims to the Banks lured by accounts of wild fishing and blood in the water.

The first one I participated in was a dandy.

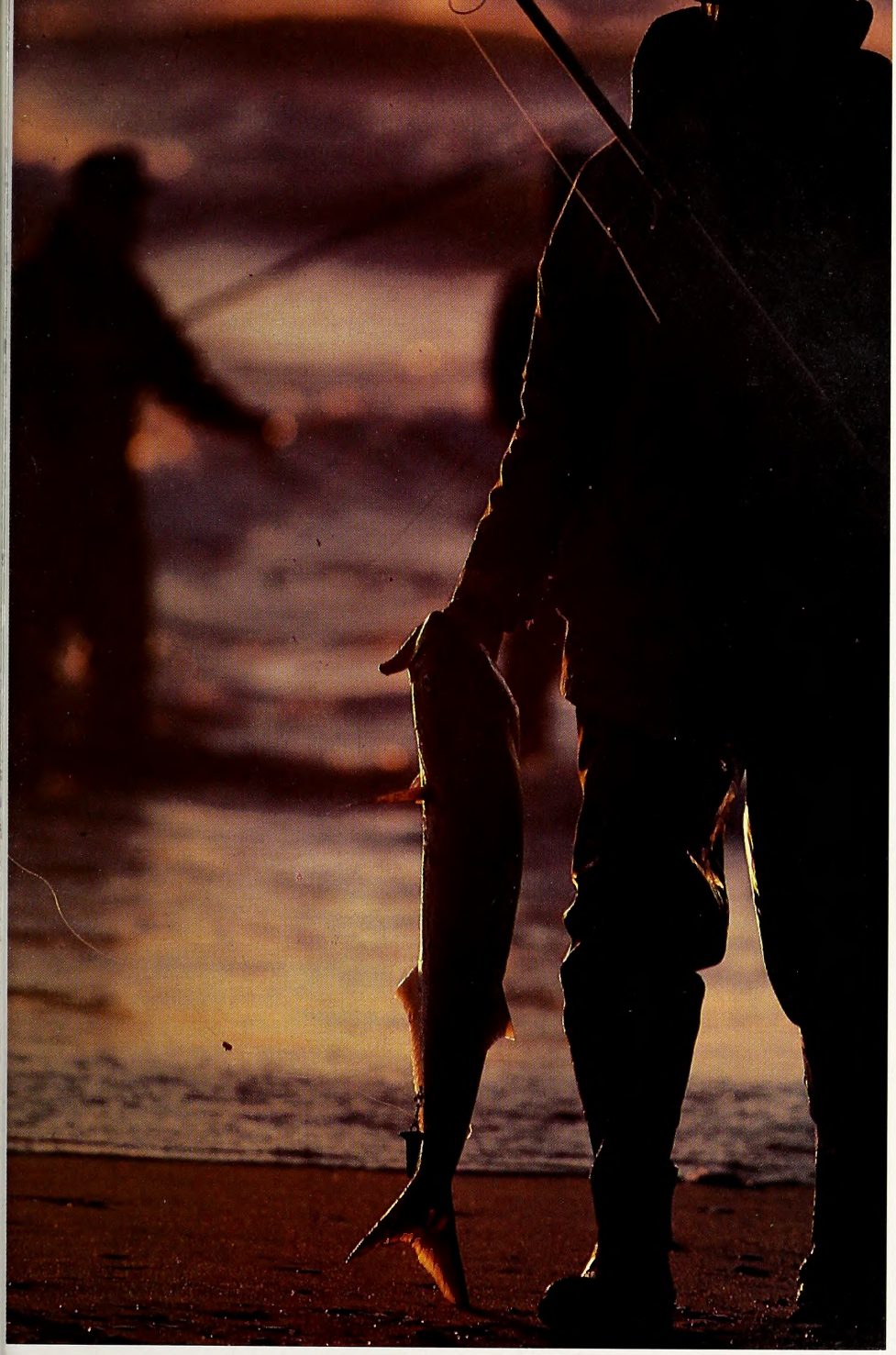
Actually, it was speckled trout that lured me to Nags Head in November of 1970. I learned on arriving that there had been a few scattered bluefish and striped bass caught in recent days north of Kitty Hawk. For some forgotten reason, however, we began the first morning at Oregon Inlet and caught just a few, maybe three, blues in the 18-pound class, the biggest I had ever seen and the first from the surf. But action ended quickly and we moved north, looking for birds.

I remember that the weather was ideal, with highs in the 60s, light northeasterly wind. In fact, it had been blowing gently from the northeast for several days and the surf had cleared to emerald green. The beach was littered with countless thousands of man-o-war jellyfish whose floats popped under our tires. We drove up from the inlet and arrived at the stretch of beach north of Jennette's Pier just as the blues and stripers moved in.

There were only a few at first, with birds working over them — gulls over the bluefish, terns over the stripers. We caught all the blues we wanted and two striped bass in just a little while and sat back in the car to watch the show. Gradually the birds increased and apparently word had been spreading like wildfire, because more and more anglers arrived on the beach. Some walked over the dunes from the road, others drove. By this time, some of the early anglers had accumulated stacks of sandy bluefish on the beach and excited drivers, intent on the now thousands of squalling gulls and scores of wildeyed anglers, ran over them and kept going as if nothing had happened. Many of these people were men, women and children who had never caught a big fish in their lives, people from Elizabeth City and Norfolk who had heard about this most amazing thing that was happening on the beach at Nags Head and had picked up freshwater tackle, anything, however inadequate, and rushed to get in on the bonanza. They cast bait and lures of every description, but it made no difference whatever, because the blues hit anything, with no hesitation, and ran off with miles of line as they snapped and cut monofilament right and left. People were screaming and cursing and bleeding from fingers incautiously thrust into fishes' mouths. Soon the riot ended when the tide turned and gradually the fishing tapered off.

Some of these fish weighed 20 pounds and a little more. You hear a lot of people say, these days, that they caught some "20-pound blues," but they didn't actually weigh them. Fish approaching 20 pounds were rare after 1972 and only recently have a few more than usual been showing up in tournaments. In 1970 and again the following fall, they were commonplace. Recently fall-run blues have averaged about 16 pounds, spring-run about 12.

There is no doubt that the resurgence of bluefish in the '70s accounted in large measure for the vast increases in Outer Banks beach traffic that occurred subsequently and continues today. Red drum and speckled trout could not have attracted the numbers of people that bluefish did because they are too hard to catch. Here, after all, was a big fish that assaulted the beach in great numbers, was fast, strong, ravenous



and utterly undiscriminating between lure types or baits. Why, anyone could catch them. At least that's what people thought and the idea sold a lot of beach buggies and motel rooms.

But they were only partly right. Despite much publicized blitzes, big bluefish over the years have proven to be not so universally available to sports fishermen and not so easy to catch when they are about. Even veteran anglers make trips to the coast in season and never see a bluefish. Before December of 1965, when a mini-blitz occurred on Hatteras Island, big bluefish were last recorded in numbers on the Outer Banks in 1935. Now their renewed presence here and elsewhere in the western Atlantic after 30 years of total absence added a new dimension to surf, pier and inshore fishing. Without them, North Carolina coastal angling in the last 20 years would be much the worse.

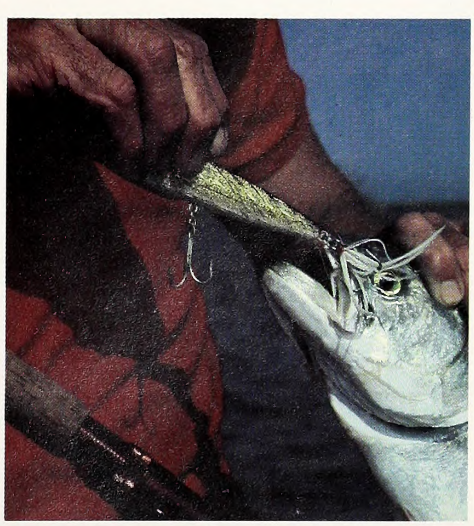
Bluefish occur in many of the earth's oceans, along the shores of North and South America, Africa and even in the Pacific. In eastern America, they generally are distributed from Massachusetts to Florida, with smaller fish in the Gulf of Mexico. In years when populations are large, a few range to Nova Scotia and Cuba. There are blues off Venezuela, Brazil and Uruguay.

Bluefish everywhere, not just in North Carolina, display wild and mysterious fluctuations in abundance over a period of years. Hal Lyman in *Successful Bluefishing* (112 pp., $15, Salt Water Sportsman, 186 Lincoln St., Boston, MA 02111), quotes one Zaccheus Macy in his *Account of Nantucket* to the effect that bluefish were abundant for five years around the Massachusetts island when settlers first arrived, then suddenly disappeared in 1764. Big blues have reportedly done this in over 200 years of fishing records.

Numbers of theories have been put forward to explain these population variations, but none is totally convincing. Lyman offers his own: Since bluefish have been present in the western Atlantic during this cycle longer than any other period in recorded history, and since bluefish are known to be susceptible to parasites that proliferate only when the population reaches a certain density, perhaps, he suggests, heavy fishing pressure these days is keeping the population cropped below the critical level at which disease or parasites can spread and wipe out all but a few survivors. Under Lyman's theory, the population crash never occurs and we continue to enjoy good fishing.

It is a good idea, but there are other possibilities, too. In the past, perhaps the fish have gone somewhere else—to Africa or South America. We don't know, but research goes on.

At one time it was thought, without much evidence, that there was only one race of bluefish in the western Atlantic and that



Bluefish in the 15- to 18-pound class were common during the early years of the cycle, and 20 pounders were by no means unusual, but in recent years, the average size has dropped. Smart anglers are wary of the teeth that can deliver a nasty bite (above).

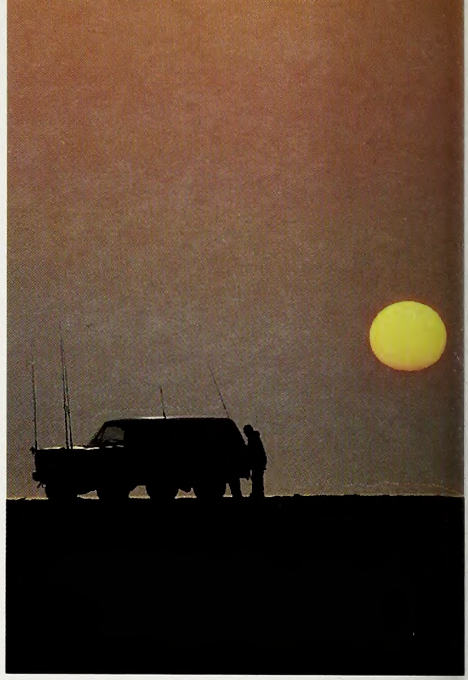
migrations were principally north and south. Tagging studies have revealed, however, that the situation is much more complicated than that. There are at least two, possibly three or more, distinct races. One, called the "southern spring spawners," breeds off the mid-Atlantic coast at the edge of the Gulf Stream. Another, the "northern summer spawners," breeds closer to shore between Chesapeake Bay and Cape Cod. Young of these northern fish move southward in the fall to spend their first winter off the Carolinas, then move into the sounds in the spring. From then on, these fish apparently migrate north in the spring and back again in the fall. Just how far they migrate and how far offshore they move is still largely unknown.

Young of the "southern spring spawners" move southward offshore and contribute to the Florida winter fishery. Apparently there is yet another race that breeds off Florida.

All this is quite complicated, and may prove to be even more so as additional studies are made. Researchers have concluded that bluefish are more oceanic than formerly thought, rather than associated with inshore waters, and that movements are less predictable.

For several years, there was a commercial fishery in the winter off Cape Fear, and whenever weather permitted, sports fishermen could run the 35 or so miles from Southport or Carolina Beach Inlet to the fishing grounds near the Frying Pan Shoals navigation tower. Those fish failed to show up in the winter of 1981/82 and only a few have returned since. Similarly, sportfishing success in spring and fall is largely dependent on whether any numbers of blues move close to shore where anglers can get at them, either from pier, surf or boat. Factors such as currents, turbidity, presence of bait and temperature are so complex that fishing success is highly unpredictable even though we may know from recent catch records that the fish population level is high.

The largest bluefish recorded as a sportfishing catch is attributed to James Hussey of Tarboro. His fish was caught off Hatteras Island on January 30, 1972, and, at 31 pounds, 12 ounces, no other records even come close. No other listing of the International Game Fish Association even exceeds 25 pounds. Hal Lyman reports an old handline catch of 45 pounds from



The sustained high cycle of big blues has probably done more to sell beach buggies and four-wheel drive vehicles than any other single factor, but their use on the Outer Banks has not always been without controversy and there are now restrictions on many beaches.

Northern Africa, but the U.S. has a virtual monopoly on world sport fishing records. The exceptions are a 17-pound, 10-ounce fish from the Canary Islands in 1981 and a 24-pound, 3-ounce fish from the Azores in 1953.

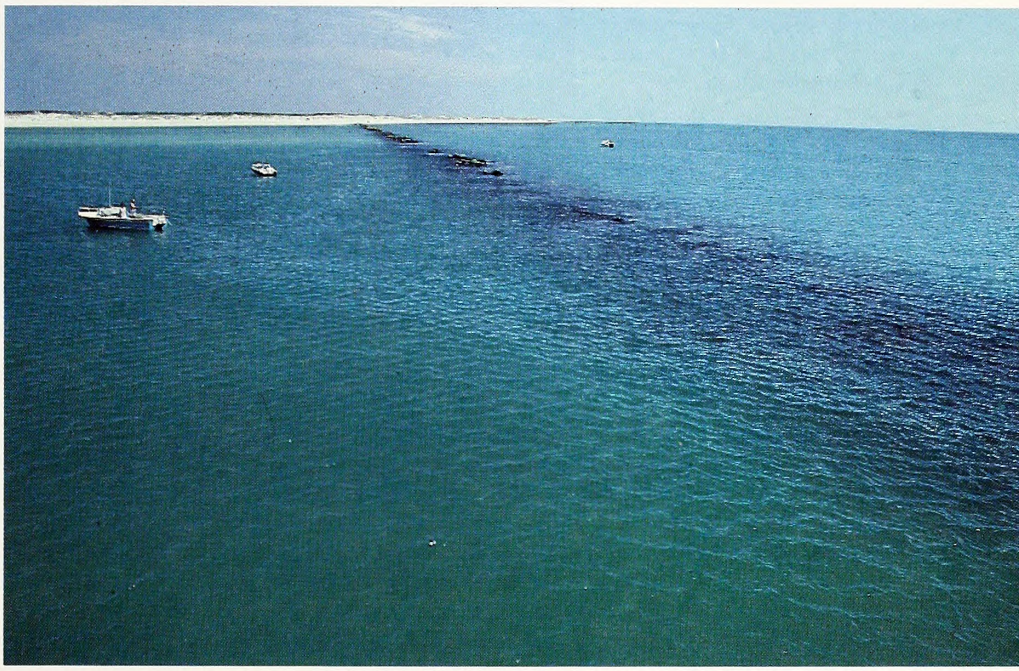
Some of these bigger fish are quite old, as fish go. Growth rates slow down as bluefish reach about six years, so that a 15-pound fish is likely to be about 10 years old, a 17½-pounder about 14. Bluefish tend to be thick and heavy in the fall, big-headed and rakish in the spring. Some blues caught at Oregon Inlet in the spring of 1983 were exceptions, however, being heavy for their length and weighing, some of them, over 18 pounds.

Such fish are a challenge to catch on light tackle. Wherever anglers can find a concentration of big bluefish in relatively clear water and cast to them with line testing under 17 pounds, the level of sport increases exponentially. One of these locations is Cape Lookout shoals in April and November. Spring bluefish usually come into shallow water near the cape to feed and warm themselves. Sometimes, early in the morning, they can be found on the shoal west of Cape Lookout jetty basking like largemouth bass on a bed. These fish are not easy to entice to a lure, but they can be caught. Light-tackle angler Tom Earnhardt uses a large white popping bug and picks up the lure noisily and casts it repeatedly to goad the fish into striking. Fair weather in the fall produces calm seas and clear water on cape shoals where bluefish may be in packs stalking menhaden, mullet and other bait. These fish will readily take any surface lure over 3 inches in length and they show a preference for a noisy one, like the Arbogast Scudder.

The most interesting bluefish angling I have seen occurs at Oregon Inlet in May and June. Guide Vernon Barrington of Wanchese showed me schools of blues up on the extensive shoals south of the inlet and stretching along the western side of Hatteras Island. We cast to them with 8-foot spin rods and pencil poppers with great success and one year even teased some close to our boat with a hookless popper so that Chico Fernandez could get one on fly. He was fishing 6-pound test leader and caught an 11-pound fish.

Although many North Carolina bluefish are caught from boats out to the edge of the Gulf Stream, particularly around wrecks, most are hooked from piers and the surf. The fall run usually begins in October with a few fish caught from the beach north of Kitty Hawk. Oregon Inlet frequently is a hot spot for weeks at a time and sometime in early November the first fish appear at

"The largest bluefish recorded as a sportfishing catch is attributed to James Hussey of Tarboro. His fish was caught off Hatteras Island on January 30, 1972, and, at 31 pounds, 12 ounces, no other records even come close."



At times, especially when bluefish are gathered on shoals, a noisy popping bug worked on a salt-water flyrod can provide the ultimate in action with out-sized chopper blues.

Cape Hatteras Point. This spot, the hub of surf fishing in the mid-Atlantic, may very well be the most consistent producer of bluefish in the world—if you can stand the crowds. Through the winter, blues may appear whenever there is mild weather at Hatteras Inlet, Ocracoke Inlet, along the Core Banks and at Cape Lookout shoals. Less frequently the big fish come to the shore south of Lookout.

In the spring, usually by mid-April, there are jumbos in the surf zone of Core Banks and particularly on Cape Lookout shoals. May and the first two or three weeks of June are tops for Oregon Inlet. In summer only a few stragglers are left around the inlets. However, there are smaller blues weighing up to 5 or 6 pounds near inlets all along the coast from spring through fall. Some of the most enjoyable late summer fishing I know is for 2- to 5-pound blues on 8-pound line and topwater plugs beside marsh islands near Outer Banks inlets. These snappers come into the inlets on falling tide and work upcurrent into the sounds, slashing bait they trap against a bank or shoal. They are spectacular surface strikers and tough fighters.

If the big blues behave true to form, they will suddenly be gone one day, just as they always have. I look on their continued presence as a gift. Although we had more speckled trout before the blues came back, I'm not sure there was a connection. If the great bluefish disappearing act occurs again, I, for one, will miss them. ⊠

Fines Total More Than $6,000

Youth Catches Trio In Act Of Killing Sea Turtle

Written and Edited by Mark Taylor

As in the movie *High Noon*, sometimes it takes only one brave soul to make a difference. For Ritchie Lewis, a 10-year old boy from Elon College, high noon came on June 3 last summer at Atlantic Beach. As a result of Ritchie's actions, the stiffest penalties ever assessed for an endangered species case in North Carolina were levied for the brutal killing of a threatened loggerhead sea turtle.

Ritchie was fishing with his family on the Sportsman's Pier at Atlantic Beach when they heard that a sea turtle was on the beach. The hour was late — 2:19 a.m. — but Ritchie and another boy decided to investigate. They found a female loggerhead turtle laying her eggs near the pier, and returned to tell their families. Ritchie's father and brother-in-law agreed to come watch, but said they had to pack up their gear first. Ritchie returned to watch the turtle.

A gruesome sight awaited. Three men from the pier had pulled the turtle off her nest — the eggs were uncovered — and flipped her on her back. Then, each man took turns sitting on the turtle and slashed and cut her throat with knives. Ritchie ran back to the pier and told his father that three men were killing the turtle. His father and brother-in-law came down to the beach, saw the men slashing the helpless animal, and returned to the pier office to call the police.

Meanwhile, the three men who had killed the animal returned to the pier. The pier owner did not know the identity of the men who killed the turtle, and the eldest of the trio walked into the office to ask what the commotion was all about.

"Somebody killed a sea turtle on the beach," the pier owner replied.

"Is that a big deal," he asked.

"Oh yeah, there's a big fine and jail sentence," the pier owner replied. "The police are on their way."

He promptly disappeared, and Atlantic Beach police apprehended the men in their truck as they were preparing to leave — they had been identified by the Lewis family.

The case was tried in federal court in New Bern on September 18 before United States magistrate Kenneth McCotter. All three men plead and were found guilty of a misdemeanor charge of taking threatened wildlife under the federal Endangered Species Act of 1973. The outcome of the case was as follows:

— Russel Rogers Rouse, Sr., 46, LaGrange, received a six-month suspended sentence and was placed on probation for three years. He was fined $2,250, and was ordered to perform 150 hours of community service. He was also ordered to pay $667 in wildlife replacement costs to the N.C. Wildlife Resources Commission (each man paid one-third of the replacement cost of a sea turtle).

— Russel Rogers Rouse, Jr., 24, LaGrange, received a six-month suspended sentence and was placed on probation for three years. He was fined $1,500, and was ordered to perform 150 hours of community service. He also paid $667 in wildlife replacement costs for the sea turtle.

— Jerry Kent Aldridge, 24, LaGrange, received a six-month suspended sentence and was placed on probation for two years. He was fined $750, and was ordered to pay $667 in wildlife replacement costs.

"We're very pleased at the outcome of this trial," said Ted Curtis, law enforcement agent for the U.S. Fish and Wildlife Service, who handled the case. "This is the highest penalty ever levied for an endangered species case in North Carolina — fines and replacement costs totaled over $6,500. This shows that the courts are treating threatened and endangered wildlife cases very seriously. Although the state law protecting sea turtles carries only a maximum fine of $50, the federal regulations protecting these and other threatened and endangered animals carry severe penalties. The outcome of this case should serve as a deterrent to others.

"We're also pleased at the courage and public spirit displayed by Ritchie and his family. One provision of the endangered species act provides that in special cases the Secretary of Interior may grant a reward to anyone who offers information leading to a conviction, and we've recommended that Ritchie be considered."

Lisa Taylor

A Gruesome Sight: *The brutal killing of a threatened loggerhead sea turtle last summer at Atlantic Beach resulted in the highest penalties ever paid for an endangered species case in North Carolina. Atlantic Beach patrolman Myron Guthrie (left) and N.C. Marine Fisheries Officer Danny Nicely (right) arrested three LaGrange men for the crime.*

Second Place

Hound Story Cops Award

An article published in *Wildlife In North Carolina* was recently honored in the annual awards competition of the Outdoor Writers Association of America. Curtis Wooten's article on Plott hounds in the October 1983 issue, entitled "Johannes Plott's Famous Hunting Dogs," received second place in the Ralston Purina outdoor writing contest.

"We're very pleased to have won this award," said Sid Baynes, chief of the Wildlife Commission's Division of Conservation Education, which produces *Wildlife In North Carolina*. "North Carolina has a fascinating outdoor heritage, and Curtis did an excellent job of portraying this in his article."

Study Will Examine Habitat

What Causes Mountain Deer Herds To Vary?

Leonard Lee Rue, III

Why The Difference: *Biologists are studying deer habitat in the mountains to determine why herds do well in some areas and poorly in others.*

Why do deer fare well in some mountain areas and poorly in others? Biologists with the N.C. Wildlife Resources Commission are studying this question, and their answers may lead to changes in deer management in western North Carolina.

"We've selected three areas with different habitat and herd characteristics for this study," said Scott Osborne, deer project leader for the N.C. Wildlife Resources Commission. "These include the Flat Top area in Yancey County, Pisgah ranger district in Haywood, Henderson and Transylvania counties, and the Standing Indian area in Macon County. Current and past land-use patterns, habitat types, browse characteristics, and the physical characteristics of the deer herds will be analyzed in these areas."

The Flat Top area is the most productive. The deer herd is fairly large, and hunter success is good. Deer here are generally heavier than those of the same age and sex in the other areas. The Pisgah ranger district has a smaller deer herd, lower hunter success, and smaller animals. The Standing Indian area has the lowest productivity and harvest rate of the three.

"We're trying to learn more about the factors which limit productivity of mountain deer herds," said Osborne. "This problem is not unique to North Carolina — low productivity for deer is a problem throughout the southern Appalachians. The first step is to determine how past land uses and harvests have affected deer numbers and their physical characteristics. This is being done by examining U.S. Forest Service and N.C. Wildlife Commission records.

"We're also evaluating how timber and wildlife management practices affect the quality of deer browse. Over the years, a lot of timber and wildlife management has been done on all of these areas, including timber harvesting and thinning, prescribed burnings, and the maintenance and development of openings and wildlife food plots. On each area the age and type of vegetative cover will be determined, and the availability and nutritional value of the browse will be examined. This is being done in cooperation with the University of Georgia School of Forest Resources, which is conducting similar studies on wildlife management areas in the mountains of Georgia and Tennessee.

"We're also studying the physical characteristics and habits of the deer herds in these areas. Important seasonal foods of deer will be determined, and this will be correlated with the weights and general health of the animals. In the future, all of this information should help us develop habitat management plans that will produce larger and healthier deer herds."

It's A Public Document

About That Magazine Mailing List

In recent months, *Wildlife In North Carolina* has received a number of calls and letters asking why the magazine's mailing list has been used by various other groups or private firms for their own mailings.

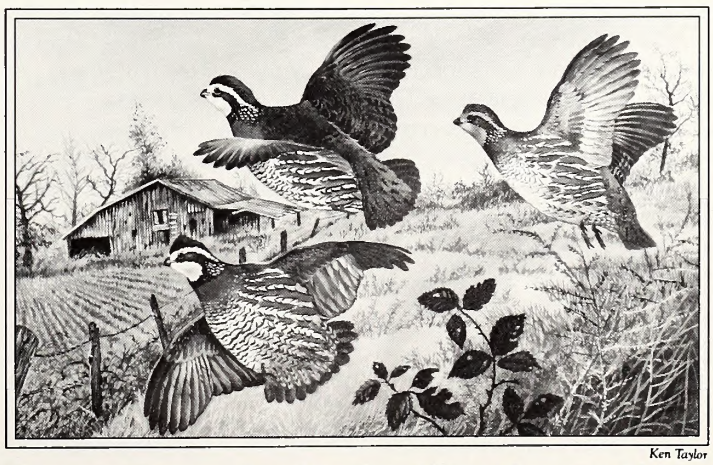
While we realize that many of our readers would prefer not to receive such mailings, the North Carolina Wildlife Resources Commission which publishes *Wildlife In North Carolina* has only limited control over the use of this list since, by law, the list has been ruled as a public document. Under this ruling, upon request, a group that pays the retrieval costs may obtain the list for its own use. Indeed, the staff does not handle these requests and is often aware of the use of the list only when a subscriber calls or writes.

We know this may be an irritation to some of our readers and we regret any inconvenience; however, we hope that you will continue to enjoy reading *Wildlife In North Carolina*. We value you — our readers — and your support for the future of wildlife.

The Editors

Deadline December 31

Last Chance For First Stamps



Ken Taylor

Your Last Chance: *Sets of the "First Of State" hunting and fishing license stamps, including the 1983-84 sportsman's stamp painted by wildlife artist Duane Raver, will be available through December 31, or until the supply is exhausted. Information and order form are available free from First of State Hunting and Fishing Stamps, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.*

Fish Barrier Built In Record Time

Volunteers Cooperate On Project To Restore

Joe Summer

A Good Day's Work: *Members of several Trout Unlimited chapters in western North Carolina recently banded together and built a rough fish barrier on Frankum Creek near Lenoir.*

Dawn rose gloomily over the mountains of Caldwell County in the Pisgah National Forest on July 14. Despite a steady drizzle and the threat of worse weather to come, a dozen or more cars were soon assembled at the entrance to Frankum Creek road. By day's end more than 40 members of the Rocky River (Charlotte), Tablerock (Morganton), Nat Greene (Greensboro), and Northwestern (Hickory) chapters of Trout Unlimited had joined together to restore trout to a small mountain stream.

Frankum Creek is located near Lenoir, and once supported a healthy trout population. The downfall of the creek occurred nearly a decade ago when a large clearcut filled the creek with siltation and raised water temperatures. Soon, the trout were gone. Since then, nature has healed the creek's wounds and much of its original water quality has returned. Unfortunately, only large populations of suckers and other nongame fish remain. Competition from nongame fish, along with a lack of suitable cover, currently are the major limiting factors for trout.

In 1983, Allen Baker, vice-president of the Rocky River Chapter of Trout Unlimited, was looking for a good stream reclamation project for the chapter. His search led him to Monte Seehorn, a regional fisheries biologist with the U.S. Forest Service. Monte recommended Frankum Creek, and brought in another Forest Service biologist, Larry Neuhs, to assist. The chapter received matching funds from national Trout Unlimited to construct a rough fish barrier under the organization's "Embrace A Stream" program.

Members of the chapter had rented a front-end loader, and the barrier quickly began to take shape. The "dozer" leveled a site in the stream bed, and dug notches 10 feet deep into both banks so that the large support logs could be anchored securely — preventing a washout in high water. Members and Forest Service personnel had felled 14 large oak and hemlock trees the day before, and these were moved to the site. All but the 40-foot anchor logs were moved by hand — causing more than a few aching backs.

Each log was notched to achieve a tight fit, and crisscrossed in a log-cabin fashion to form a sturdy crib. Metal rods were used to reinforce the structure, and the crib was filled with rocks by the front-end loader. The effect was to form a dam which would prevent undesirable species of fish from passing upstream.

The barrier was completed by 6 p.m., and water backed up to a depth of 4 feet and began trickling over the top, signifying that the structure had begun to seal. I asked Monte Seehorn how we had done, and he replied that he'd never seen a fish barrier go up so quickly. I couldn't help but feel a deep sense of pride, and although everyone was tired and sore, they shared this feeling.

Future plans for Frankum Creek include removal of rough fish by electro-shocking, restocking with brown trout, and placement of artificial cover devices in the stream. The Rocky River Chapter of Trout Unlimited welcomes any individuals or groups who would like to participate in these efforts. For more information contact Allen Baker, Route 2, Box 294, Huntersville, N.C. 28078.

— John Welfare, Charlotte

Free Permits Available

Canvasback Hunt A Success

North Carolina sportsmen will once again have an opportunity to hunt canvasbacks — long considered the "King of ducks." Dwindling populations of canvasbacks prompted the closure of hunting seasons for several years, but biologists believed that the small, but stable, population could support a limited harvest. Consequently, a permit-only hunt for canvasbacks was held in a special zone in Pamlico Sound last year and the hunt was considered a success.

Canvasback hunting will also be allowed in a special zone in Pamlico Sound this year, and hunters must have a free permit to participate. The special canvasback season will run from January 9-19. The daily bag limit is four canvasbacks, of which only one can be a hen. During this season, canvasbacks count as part of the regular bag limit for ducks.

"Last year's season was designed to harvest 10,000 canvasbacks in five states in the Atlantic Flyway, and 8,965 cans were actually taken," said Grady Barnes, section manager for research and regulations for the Division of Wildlife Management of the N.C. Wildlife Resources Commission. "About 1,500 canvasbacks were harvested in North Carolina. The hunt was very successful, and we're pleased with the hunters' cooperation and compliance with new regulations."

Canvasbacks were once the staple of the exclusive duck hunting clubs that lined Currituck Banks at the turn of the century, but a number of factors led to their decline. The drainage of prairie potholes for agriculture and other uses in the midwest eliminated much of their breeding habitat. Pollution and loss of wetlands in Chesapeake Bay has also caused more canvasbacks to winter in the Mississippi Flyway. About 40,000 to 50,000 canvasbacks currently winter in North Carolina — mostly in Pamlico Sound.

Free canvasback permits are available from the Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Tried And True Roast Or Stew

Colonial Dutch Oven Great For Game Cookery

The dutch oven has been a popular utensil for cooking wild game since the first settlers set foot on the North Carolina coast 400 years ago. Of equal utility in the hunter's camp and modern kitchen, the deep-sided, heavy-gauge, cast-iron pot with its heavy lid is ideally suited for the preparation of rich, brothy soups and stews and roasts that tantalize the senses. In my household it is a cooking utensil that sees heavy use during the winter months. The aromas that escape its confines combine with the warmth of a winter kitchen to produce a balm that warms the soul, soothes the spirit, and stimulates a hearty appetite.

It is probably not just coincidence that the increased usage of my dutch oven coincides with deer hunting in North Carolina. In fact, venison is one of my favorite dutch-oven dishes.

If yours is a hunting household and you have a dutch oven or similar heavy pot on hand, try the following recipe for a stove-top venison roast. Leftovers are seldom a problem, and there's almost always a request for a repeat performance.

Hamilton's Venison Roast

3-4 lb. venison roast (bone and fat removed)
6 strips bacon
2-3 cloves garlic (slivered)
Kitchen Bouquet (gravy additive)
salt, pepper
flour
1 8-oz. can of golden cream of mushroom soup
crushed red pepper
1 medium onion, diced
1 medium onion, sliced
16 oz. jar of mushrooms (drained) or ¾ lb. fresh mushrooms.

With a sharp-pointed knife, pierce the roast across its surface and insert slivers of garlic. Coat with Kitchen Bouquet, salt and pepper, and roll it in flour.

In a heavy pan over medium heat, cook the bacon strips until crisp. Remove the bacon from the pan, heat bacon grease to near smoking, and sear roast on all sides until well browned. Set aside.

In a dutch oven combine one can of golden cream of mushroom soup with ½ can of water. Heat, adding diced onion, salt, pepper, and crushed red pepper to taste. Color with Kitchen Bouquet, being careful not to get it too black.

Place roast on a rack in the dutch oven, secure onion rings on top with toothpicks, and pour drained canned or fresh mushrooms over the roast. Cover and cook slowly on stove top, camp stove, or coals for 2½-3 hours or less. For medium-rare center, serve when temperature at the thickest part of the roast is 140 degrees. It's medium at 150 degrees, and well done (and getting tough and tasteless) at 160 degrees.

—*Curtis Wooten*

Conservation Contributions Recognized

Senator Hardison Honored

Ken Taylor

A Job Well Done: *Senator Harold W. Hardison of Deep Run was recently presented with a limited-edition art print of the 1984 North Carolina Waterfowl stamp in recognition of his outstanding contribution to wildlife conservation in North Carolina. Hardison sponsored legislation which returns a portion of tax receipts from the sale of hunting and fishing equipment to the N.C. Wildlife Resources Commission for wildlife/conservation programs. Presenting the print are J. Robert Gordon (right) of Laurinburg, chairman of the Wildlife Commission, and Vernon Bevill (left), executive director of the Wildlife Commission.*

"This legislation is a great step for wildlife conservation," said Gordon. "The Wildlife Resources Commission and the sportsmen of North Carolina owe a great deal of gratitude to Senator Hardison for having conceived of this bill and worked for its passage."

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Reader Encounters Him At Hatteras

"Cousin William" Universally Despised By Anglers

Dear Sir:

I enjoy *Wildlife In North Carolina* magazine each month, "Our Natural Heritage" being my favorite. It always seems to remind me of my own experiences. I couldn't help telling you about a fishing story similar to that in your August issue.

Seven men and four boys had made up our annual Thanksgiving weekend fishing trip to Hatteras. We had three campsites on the back row of the open portion of the campground, and had settled in Thursday evening.

Friday morning, after a full breakfast, we headed out for some serious fishing. The reports had not been good, just occasional small blues and flounder, so we weren't expecting a big haul. We picked a spot about a mile south of the Point where we could spread out all four vehicles and give the boys plenty of space to keep from tangling lines. We could see other fishermen in both directions, but none were very near. Before we put our lines in the water, I cautioned everyone that if they caught anything to slide it in on the sand and I would take a towel to pick it up and carry it to the cooler so no one else would know we were having any luck and try to get into our spot.

It wasn't long before we started to pull in some right good flounder and an occasional blue. Everything worked well, I'd casually walk down to the fish, slip a towel around him, unhook the line, and slip him in a cooler. No one in either direction seemed to notice. The weather was perfect and we had settled down to a nice day's fishing.

One of the boys was using a Zebco 202 reel on about an 8-foot pole and was fishing on the

north end of our group. He was just able to get his rig into the surf good, but had caught several small flounder. Somehow he latched onto a big one, a 3-pound flounder, that to him looked like a monster when it hit the sand. All that playing it cool was over. This one had to be seen. He held up his pole with the fish dangling and yelled to us to look. I tried to get to him to cover the fish, but it was too late. There were actually people running down the beach to see what he had caught. It didn't take long; trucks maneuvered in between ours, poles were set up every few feet, and it became almost impossible to fish — especially for the boys. We gathered up our equipment, cooler full of fish, and headed back across the dunes.

Needless to say, we had a feast that night with more fish than we could possibly eat. We even shared some around the campground. But I can certainly feel at home with other fishermen whose "Cousin William" slides in close when you have fishing luck.

Nick Lomonte and Doug Peacock of Raleigh were on that trip and they also had a ton of stories about their "Cousin Williams."

— Donald Bryant, Raleigh

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on August 31, 1984

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	9,576	$2,861,363.61
Lifetime Hunting License	100	17,882.39
Lifetime Fishing License	526	87,657.37
Lifetime Subscriptions to Wildlife in N.C.	318	36,462.02
Contributions	—	41,493.10
	Fund Total:	$3,044,858.49

Calendar Of Events

December 8-9
Open House at the Museum of Southern Decorative Arts in Winston-Salem.

December 11
Christmas at Old Salem. Recreation of a 19th-century Christmas at this historic site.

December 16
A Colonial Christmas at the Shiele Museum of Natural History in Gastonia.

December 17
First Flight Commemoration at the Wright Brother's National Memorial at Kill Devil Hills.

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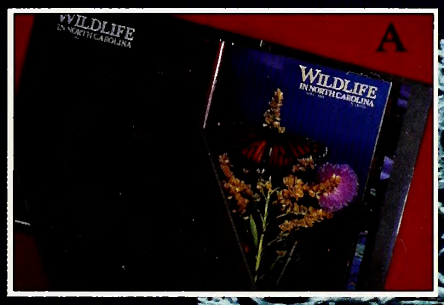

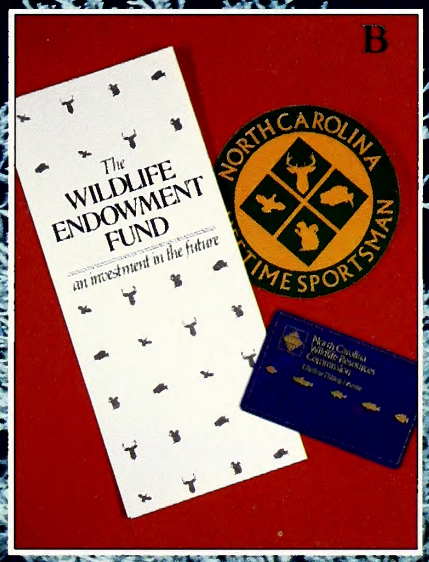

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